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<110> Brana, Alfredo F
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Moss, Steven
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Oliynyk, Marko
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Sanchez, Cesar
Wilkinson, Barrie

<120> BORRELIDIN PRODUCING POLYKETIDE SYNTHASE AND ITS USES

<130> 4408-P03626US00

<140> US 10/534,210

<141> 2005-05-06

<150> PCT/GB03/005704

<151> 2003-12-24

<150> GB0230217.2

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Gly	Leu	Val	Ala	Thr	Ala	Gln	Val	Val	Gln	Val	Ser	Asp	Glu	Leu	Gly				
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Ile	Gly	Pro	Leu	Trp	Val	Ala	Thr	Arg	Gln	Ala	Val	Ser	Val	Asp	Gly				
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Ala	Asp	Glu	Ala	Asp	Gly	Ala	Gly	Arg	Thr	Arg	Lys	Ala	Asp	Asp	Pro				
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Ala	Asp	Val	Ala	Gln	Ala	Ala	Val	Trp	Gly	Leu	Gly	Arg	Val	Ala	Ala				
			1060					1065					1070						
Leu	Glu	Lys	Pro	Arg	Leu	Trp	Gly	Gly	Leu	Val	Asp	Leu	Pro	Ala	Arg				
		1075					1080					1085							
Ala	Asp	Glu	Arg	Met	Arg	Asp	Leu	Val	Ala	Gln	Ala	Leu	Thr	Ala	Pro				
	1090					1095					1100								
Asp	Ala	Glu	Asp	Gln	Leu	Ala	Val	Arg	Ala	Asp	Gly	Ile	Ala	Val	Arg				
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Arg	Leu	Val	Arg	Ser	Ala	Ala	Ser	Ala	Pro	Ala	Asp	Asp	Trp	Gln	Pro				
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Ser	Gly	Thr	Val	Leu	Val	Thr	Gly	Gly	Thr	Gly	Gly	Val	Gly	Ala	Asn				
			1140				1145					1150							
Val	Ala	Arg	Trp	Leu	Val	Thr	Gln	Asp	Ile	Gln	His	Leu	Leu	Leu	Val				
		1155					1160					1165							

Ser Arg Arg Gly Pro Asp Ala Pro Gly Ala Ala Glu Leu Leu Ala Glu
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 Leu Ser Ala Ser Gly Thr Ser Val Thr Ile Glu Pro Cys Asp Val Thr
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 Asp Ala Asp Ala Val Arg Arg Leu Ile Gly Ala Val Pro Ala Glu Arg
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 Pro Leu Ser Thr Val Val His Ala Ala Gly Val Leu Asp Asp Cys Leu
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 Ile Asp Ala Leu Thr Pro Gln Arg Leu Ala Ala Ala Leu Glu Val Lys
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 Ala Lys Gly Ala Leu Asn Leu His Glu Ala Ala Gly Glu Ala His Leu
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 Val Leu Phe Ser Ser Leu Ala Gly Thr Thr Gly Thr Lys Gly Gln Gly
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 Asn Tyr Ala Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Arg Arg
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 Tyr Gly Leu Pro Leu Met Ser Pro Asp Arg Ala Val Ala Thr Leu Arg
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 Gln Val Met Ala Glu Pro Val Ala Thr Gln Val Val Ala Asp Val Asp
 1345 1350 1355 1360
 Trp Gln Arg Phe Val Ala Asp Phe Thr Ala Val Arg Pro Ser Arg Leu
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 Leu Ala Asp Leu Pro Glu Val Arg Ser Leu Gly Glu Gln Arg Lys Asp
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 Gly Pro Gly Gly Gln Gly Glu Glu Asp Gly Leu Ala Ser Lys Leu Ala
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 1410 1415 1420
 Glu Leu Val Leu Gly Val Leu Gly His Glu Thr Arg Ala Ala Ile Gly
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 Pro Asp Ser Ser Phe His Ala Ile Gly Phe Asp Ser Leu Thr Ala Val
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 Glu Leu Arg Asn Leu Leu Thr Val Arg Leu Gly Met Lys Leu Pro Ala
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 Thr Leu Val Tyr Asp His Pro Thr Leu Ser Ser Leu Ala Asp His Leu
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 His Glu Gln Leu Val Ile Asp Gly Thr Pro Met Thr Asp Thr Ala Ala
 1490 1495 1500
 Asp Leu Leu Ala Glu Leu Asp Ala Leu Ala Ala Arg Leu Ala Ala Val
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 Gly Leu Glu Pro Glu Ala Arg Ala Arg Ile Gly Arg Arg Leu Lys Asp
 1525 1530 1535

Met Gln Thr Ala Cys Glu Pro Arg Ser Glu Ser Ser Arg Asp Leu Lys
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Ser Ala Ser Arg Thr Glu Val Leu Asp Phe Leu Thr Asn Glu Leu Gly
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Ile Ser Arg
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<212> PRT
<213> Streptomyces parvulus Tu4055

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Asn Leu Gln Glu Ala Arg Gln Arg Val His Glu Leu Glu Glu Ser Glu
20 25 30
Arg Glu Pro Ile Ala Ile Val Gly Met Ser Cys Arg Leu Pro Gly Gly
35 40 45
Val Asn Ser Pro Glu Glu Phe Trp Ser Leu Leu Glu Ala Gly Thr Asp
50 55 60
Ala Val Ser Glu Phe Pro Arg Asp Arg Gly Trp Asp Val Glu Arg Leu
65 70 75 80
Tyr Asp Pro Asp Pro Asp Ala Pro Gly Lys Ser Tyr Val Arg Glu Gly
85 90 95
Gly Phe Leu Asp Gly Ala Gly Arg Phe Asp Pro Ala Phe Phe Gly Ile
100 105 110
Ser Pro Arg Glu Ala Val Val Met Asp Pro Gln Gln Arg Leu Leu Leu
115 120 125
Glu Cys Ser Trp Glu Ala Ile Glu Arg Ser Arg Ile Asp Pro Lys Thr
130 135 140
Leu His Gly Ser Arg Ala Gly Val Phe Val Gly Ser Asn Gly Gln Asp
145 150 155 160
Tyr Gly Thr Leu Leu Leu Arg Ala Asp Asp Arg Ser His Ala Tyr Leu
165 170 175
Ala Thr Gly Ala Ser Ala Ser Val Leu Ser Gly Arg Ile Ser Tyr Thr
180 185 190
Leu Gly Leu Glu Gly Pro Ala Val Thr Ile Ser Thr Ala Cys Ser Ser
195 200 205
Ser Leu Val Ala Leu His Leu Ala Ala Arg Ala Leu Arg Ala Gly Glu
210 215 220
Cys Glu Leu Ala Leu Ala Gly Gly Val Thr Val Met Pro Thr Thr Arg
225 230 235 240
Leu Phe Glu Val Phe Ser Arg Gln Arg Gly Leu Ala Gly Asp Gly Arg
245 250 255
Cys Lys Ala Phe Ala Ala Gly Ala Asp Gly Thr Gly Trp Gly Glu Gly
260 265 270
Val Gly Val Leu Val Leu Glu Arg Leu Ser Val Ala Arg Arg Asn Gly
45

275					280					285					
His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly
	290					295					300				
Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ser	Gln	Gln	Arg	Val
305					310					315					320
Ile	Arg	Ala	Ala	Leu	Ala	Ser	Ala	Arg	Leu	Ala	Pro	Glu	Asp	Val	Asp
				325					330					335	
Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Ser	Leu	Gly	Asp	Pro	Ile	Glu
			340					345					350		
Ala	Gln	Ala	Leu	Leu	Ala	Thr	Tyr	Gly	Arg	Gly	Arg	Asp	Ala	Glu	Arg
		355					360					365			
Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Ala	Gln	Ala
	370					375					380				
Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Lys	Ala	Met	Gln	Ala
385					390					395					400
Gly	Thr	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Ser	Gly	Glu	Val
				405					410					415	
Asp	Trp	Asp	Ser	Gly	Ala	Val	Arg	Leu	Leu	Thr	Glu	Ala	Arg	Asp	Trp
			420					425					430		
Pro	Ser	Glu	Glu	Gly	Arg	Leu	Arg	Arg	Ala	Gly	Val	Ser	Ser	Phe	Gly
		435				440						445			
Ile	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Glu	Pro	Pro	Ala	Glu
	450					455					460				
Asp	Ala	Val	Pro	Glu	Pro	Glu	Ala	Gly	Asp	Val	Val	Pro	Trp	Val	Leu
465					470					475					480
Ser	Ala	Arg	Ser	Ala	Glu	Ala	Leu	Arg	Glu	Gln	Ala	Ala	Arg	Leu	Ala
				485					490					495	
Ser	Val	Ala	Gly	Gly	Leu	Asn	Val	Val	Asp	Val	Gly	Trp	Ser	Leu	Ala
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Ser	Thr	Arg	Ala	Ala	Phe	Glu	His	Arg	Ala	Val	Val	Val	Gly	Arg	Glu
		515					520					525			
Arg	Glu	Glu	Leu	Leu	Ala	Gly	Leu	Phe	Ala	Val	Ala	Ala	Gly	Arg	Pro
	530				535					540					
Ala	Ala	Asn	Val	Val	Thr	Gly	Pro	Val	Ser	Ser	Gly	Arg	Pro	Ala	Phe
545					550					555					560
Val	Phe	Ala	Gly	Gln	Gly	Ser	Gln	Arg	Leu	Gly	Met	Gly	Arg	Gly	Leu
				565					570					575	
Tyr	Glu	Arg	Phe	Pro	Val	Phe	Ala	Glu	Ala	Phe	Asp	Glu	Val	Cys	Gly
			580					585					590		
Arg	Val	Gly	Pro	Gly	Val	Arg	Glu	Val	Val	Phe	Gly	Ser	Asp	Ala	Gly
		595					600					605			
Glu	Leu	Asp	Arg	Thr	Val	Trp	Ala	Gln	Ala	Gly	Leu	Phe	Ala	Leu	Glu
	610				615					620					
Val	Ala	Leu	Phe	Arg	Leu	Leu	Glu	Ser	Trp	Gly	Val	Arg	Pro	Gly	Cys
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Leu Ile Gly His Ser Val Gly Glu Leu Ser Ala Ala Cys Val Ala Gly
 645 650 655
 Leu Trp Ser Leu Glu Asp Ala Cys Arg Val Val Ala Ala Arg Ala Arg
 660 665 670
 Leu Met Gln Ala Leu Pro Ala Gly Gly Val Met Val Ala Val Arg Ala
 675 680 685
 Glu Ala Gly Glu Leu Ala Gly Phe Leu Gly Glu Asp Val Val Ile Ala
 690 695 700
 Ser Val Asn Ala Pro Gly Gln Val Val Ile Ala Gly Pro Glu Gly Gly
 705 710 715 720
 Val Glu Arg Val Val Ala Ala Cys Gly Ala Arg Ser Arg Arg Leu Ala
 725 730 735
 Val Ser His Ala Phe His Ser Pro Leu Val Glu Pro Met Leu Gly Glu
 740 745 750
 Phe Arg Arg Val Val Glu Ser Val Ala Phe Gly Val Pro Ser Leu Arg
 755 760 765
 Val Val Ser Asn Val Thr Gly Ala Trp Val Asp Pro Glu Glu Trp Gly
 770 775 780
 Thr Pro Glu Tyr Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe Ala
 785 790 795 800
 Asp Gly Val Ala Thr Leu Leu Asp Ala Gly Val Arg Thr Phe Val Glu
 805 810 815
 Leu Gly Pro Ala Gly Thr Leu Thr Ser Met Val Ser His Cys Ala Asp
 820 825 830
 Ala Thr Ala Thr Ser Val Thr Ala Val Pro Thr Leu Arg Pro Asp His
 835 840 845
 Asp Glu Ser Arg Thr Val Leu Ser Ala Ala Ala Ser Leu Tyr Val Gln
 850 855 860
 Gly His Pro Val Asp Trp Ala Pro Leu Phe Pro Arg Ala Arg Thr Val
 865 870 875 880
 Asp Leu Pro Thr Tyr Pro Phe Gln His Gln His Tyr Trp Met Met Asn
 885 890 895
 Thr Gly Ser Ala Ala Glu Pro Ala Glu Leu Gly Leu Gly Asp Ala Arg
 900 905 910
 His Pro Leu Leu Gly Ser Val Val Thr Val Ala Gly Asp Asp Lys Val
 915 920 925
 Val Phe Ala Gly Arg Leu Ala Leu Arg Thr His Pro Trp Leu Ala Asp
 930 935 940
 His Thr Val Leu Asp Ala Val Leu Leu Pro Ala Thr Ala Phe Leu Glu
 945 950 955 960
 Leu Ala Val Arg Ala Gly Glu Glu Val Ser Cys Pro Val Val His Asp
 965 970 975
 Leu Thr Leu His Arg Pro Leu Val Val Pro Glu Arg Gly Ala Val Gln
 980 985 990
 Val Gln Met Ala Val Gly Ala Pro Glu Ala Asp Gly Arg Arg Glu Val
 995 1000 1005

Arg Val Tyr Ser Arg Pro Asp Asp Asp Ala Glu His Glu Trp Thr Leu
 1010 1015 1020
 His Ala Ala Gly Leu Leu Ala Ser Ala Ala Thr Ala Glu Pro Ala Val
 1025 1030 1035 1040
 Ala Ala Gly Ala Trp Pro Pro Pro Glu Ala Gln Ala Val Asp Leu Asp
 1045 1050 1055
 Gly Phe Tyr Ala Gly Leu Ala Glu His Gly Tyr His Tyr Gly Pro Leu
 1060 1065 1070
 Phe Gln Gly Val Arg Ala Ala Trp Arg Leu Gly Asp Asp Val Leu Ala
 1075 1080 1085
 Glu Ile Val Leu Pro Glu Ala Ala Gly Ala Asp Ala Ala Arg Tyr Gly
 1090 1095 1100
 Met His Pro Ala Leu Leu Asp Ala Val Leu His Ala Ala Arg Leu Gly
 1105 1110 1115 1120
 Ala Phe Arg Glu Arg Ser Glu Glu Lys Tyr Leu Pro Phe Ala Trp Glu
 1125 1130 1135
 Gly Val Thr Leu Arg Thr Arg Gly Ala Thr Ala Val Arg Ala Arg Ile
 1140 1145 1150
 Ser Arg Ala Gly Thr Asp Ala Ile Arg Leu Asp Val Thr Asp Thr Ala
 1155 1160 1165
 Asp Arg Pro Val Leu Thr Ala Glu Ser Leu Thr Leu Arg Pro Val Ser
 1170 1175 1180
 Ala Gly Gln Leu Met Ala Val Pro Arg Asp Ser Leu Phe Arg Val Asp
 1185 1190 1195 1200
 Trp Val Ser Ala Pro Ala Ala Asn Gly Pro Gly Leu Arg Leu Ala Arg
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 Ala Ala Thr Val Glu Ala Ala Leu Ala Ala Asp Ala Asp Ile Val Val
 1220 1225 1230
 Val Pro Cys Leu Asp Ser Glu Gly Pro His Gln Ala Thr Tyr Gln Ala
 1235 1240 1245
 Leu Glu Leu Leu Gln Arg Trp Leu Ala Ala Asp Thr Gly Thr Thr Thr
 1250 1255 1260
 Leu Ala Leu Leu Thr His Arg Ala Val Ala Val Gly Asp Asp Val His
 1265 1270 1275 1280
 Asp Leu His His Ala Pro Leu Trp Gly Leu Val Arg Thr Ala Gln Thr
 1285 1290 1295
 Glu His Pro Gly Cys Phe Arg Leu Val Asp Ser Asp Asp Pro Asp Pro
 1300 1305 1310
 Thr Thr Asp Val Leu Ala Ala Ala Leu Ala Thr Gly Glu Pro Gln Val
 1315 1320 1325
 Ala Ile Arg Asp Gly Ala Val Leu Ala Pro Arg Leu Thr Ala Ala Ser
 1330 1335 1340
 Ala Pro Arg Glu Pro Ala Glu Trp Asp Ala Glu Gly Thr Val Leu Ile
 1345 1350 1355 1360
 Thr Gly Gly Ser Gly Ala Leu Ala Gly Ile Val Ala Gln His Leu Val
 48

1365	1370	1375
Ala Arg His Gly Val Arg Arg Leu Val	Leu Ala Ser Arg Ser Gly Arg	
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Pro Ala Pro Gly Ala Asp Leu Leu Asp Ala Asp Val Thr Ala Val Ser		
1395	1400	1405
Cys Asp Val Ser Asp Arg Asp Ala Val Ala Ala Leu Leu Ala Ser Val		
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Pro Asp Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val Leu		
1425	1430	1435
Asp Asp Gly Val Leu His Ala Leu Thr Thr Glu Arg Ile Asp Thr Ser		
1445	1450	1455
Phe Ala Ala Lys Val Asp Gly Ala Arg His Leu His Glu Leu Thr Ser		
1460	1465	1470
His Leu Asp Leu Thr Ala Phe Val Leu Phe Ser Ser Ala Ser Ala Val		
1475	1480	1485
Leu Gly Ala Ala Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala Tyr Leu		
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Asp Ala Leu Ala Ala His Arg Arg Ser Asn Asp Leu Pro Ala Val Ser		
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Leu Ala Trp Gly Leu Trp Ala Glu His Glu Gly Met Ala Arg Gly Leu		
1525	1530	1535
Gly Asp Ala Glu Leu Thr Arg Ile Ser Arg Ile Gly Val Thr Ala Leu		
1540	1545	1550
Ser Ala Glu Asp Gly Met Arg Leu Phe Asp Ala Gly Cys Ala Gly Asp		
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Gln Ser Gln Leu Val Pro Met Arg Val Asp Thr Ala Ala Leu Arg Ala		
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Arg Arg Asp His Leu Pro Ala Pro Met Trp Ser Leu Val Pro Glu Arg		
1585	1590	1595
Thr Arg Ala Ala Arg Thr Gln Pro Ala Ala Ser Leu Arg Asp Arg Leu		
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Ala Glu Leu Thr Ala Pro Glu Arg Lys Arg Thr Val Leu Asn Leu Val		
1620	1625	1630
Arg Asn Ala Val Ala Asp Thr Leu Gly His Asn Ala Ala Asp Gly Val		
1635	1640	1645
Pro Pro Asp Gln Ser Leu Asp Ala Ala Gly Phe Asp Ser Leu Thr Ala		
1650	1655	1660
Val Glu Phe Arg Asn Arg Leu Ser Ala Val Thr Asp Leu Arg Leu Pro		
1665	1670	1675
Ala Thr Leu Thr Tyr Asp His Pro Thr Pro Ala Ala Ile Ala Glu His		
1685	1690	1695
Ile Leu Thr Arg Leu Thr Leu Leu Lys Glu Thr Ala Ala Pro Ala Val		
1700	1705	1710
Gly Thr Ala Pro Val Ala Ala Pro Thr Glu Asp Asp Ala Ile Val Ile		
1715	1720	1725

Val Gly Met Ala Gly Arg Phe Pro Gly Gly Val Arg Thr Pro Glu Gly
 1730 1735 1740
 Leu Trp Asp Leu Val His Ser Gly Thr Asp Ala Ile Ser Glu Trp Pro
 1745 1750 1755 1760
 Thr Asp Arg Gly Trp Asp Val Glu Asn Leu Tyr Asp Pro Asp Pro Asp
 1765 1770 1775
 Ala Val Gly Lys Ser Tyr Val Arg His Gly Gly Phe Leu His Asp Val
 1780 1785 1790
 Ala Gly Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu
 1795 1800 1805
 Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Cys Ser Tyr Glu Ala
 1810 1815 1820
 Leu Glu Arg Ala Gly Ile Asp Pro Ala Thr Leu Arg Gly Ser Arg Ser
 1825 1830 1835 1840
 Gly Val Tyr Ala Gly Val Met Tyr His Glu Tyr Ala Ser Arg Leu Gly
 1845 1850 1855
 Ala Thr Pro Ala Gly Phe Glu Gly Thr Leu Gly Thr Gly Ser Ser Gly
 1860 1865 1870
 Ser Ile Ala Ser Gly Arg Ile Ser Tyr Thr Phe Asp Leu Thr Gly Pro
 1875 1880 1885
 Ala Val Thr Val Asp Thr Ala Cys Ser Thr Ser Leu Val Gly Leu His
 1890 1895 1900
 Leu Ala Val Gln Ala Leu Arg Ala Gly Glu Cys Glu Leu Ala Leu Ala
 1905 1910 1915 1920
 Gly Gly Val Thr Val Met His Thr Pro Arg Pro Phe Val Glu Phe Ser
 1925 1930 1935
 Arg Gln Arg Gly Leu Ala Ala Asp Gly Arg Ser Lys Ala Phe Ala Ala
 1940 1945 1950
 Ser Ala Asp Gly Val Ala Trp Ala Glu Gly Ala Gly Ile Leu Val Leu
 1955 1960 1965
 Glu Arg Leu Ser Ala Ala Arg Arg Asn Gly His Arg Val Leu Ala Val
 1970 1975 1980
 Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr
 1985 1990 1995 2000
 Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Ala Ala Leu Ala
 2005 2010 2015
 Ser Ala Gly Leu Gly Pro Ala Asp Val Asp Val Val Glu Ala His Gly
 2020 2025 2030
 Thr Gly Thr Ala Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala
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 Thr Tyr Gly Arg Gly Arg Asp Ala Asp Arg Pro Leu Trp Leu Gly Ser
 2050 2055 2060
 Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala Gly Val Ala Ser
 2065 2070 2075 2080
 Val Ile Lys Met Val Gln Ala Met Gln Ala Gly Val Leu Pro Arg Thr
 2085 2090 2095

Leu His Val Asp Glu Pro Ser Gly Glu Val Asp Trp Asp Ser Gly Ala
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 Val Arg Leu Leu Thr Glu Ala Arg Glu Trp Pro Ser Gly Glu Gly Arg
 2115 2120 2125
 Val Arg Arg Ala Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala
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 His Val Ile Leu Glu Glu Pro Pro Ala Glu Asp Ala Leu Pro Glu Pro
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 Val Asp Val Leu Gly Ser Ala Gly Glu Leu Gly Arg Val Glu Val Val
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 Gln Pro Ala Leu Trp Ala Val Met Val Ser Leu Ala Arg Val Trp Arg
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 Leu Gly Gly Met Val Ser Val Ala Leu Ser Arg Glu Arg Val Val Ser
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 Ala Ala Cys Val Ser Ser Gly Val Arg Ala Arg Arg Ile Asp Val Asp
 2420 2425 2430
 Tyr Ala Ser His Ser Val Gln Val Glu Leu Ile Arg Glu Glu Leu Leu
 2435 2440 2445
 Gly Val Leu Asp Gly Ile Val Pro Arg Ser Gly Glu Ile Pro Phe Val
 51

2450	2455	2460
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Tyr Trp Tyr Arg Asn Leu Arg Gln Thr Val Glu Phe Gln Ser Val Val 2485 2490 2495		
Glu Gly Leu Val Ala Gln Gly Cys Arg Val Phe Leu Glu Ser Ser Pro 2500 2505 2510		
His Pro Val Leu Thr Val Gly Ile Glu Glu Ser Ala Asp Arg Val Val 2515 2520 2525		
Ala Leu Glu Ser Leu Arg Arg Gly Glu Gly Gly Leu Arg Arg Leu Val 2530 2535 2540		
Asp Ala Ala Gly Glu Ala Trp Val Arg Gly Val Pro Ile Asp Trp Ala 2545 2550 2555 2560		
Gly Met Leu Ala Gly Gly Arg Arg Val Asp Leu Pro Thr Tyr Pro Phe 2565 2570 2575		
Gln His Gln Pro Tyr Trp Leu Asp Ser Pro Arg His Pro Ala Gly Asp 2580 2585 2590		
Val Thr Ala Val Gly Leu Thr Glu Ala Gly His Ala Phe Val Pro Ala 2595 2600 2605		
Ala Val Asp Leu Pro Asp Gly Gln Arg Val Trp Thr Gly Arg Leu Ser 2610 2615 2620		
Leu Pro Ser Tyr Pro Trp Leu Ala Asp His Gln Val Leu Gly Gln Val 2625 2630 2635 2640		
Leu Leu Pro Gly Val Val Trp Val Glu Leu Ala Leu His Ala Gly His 2645 2650 2655		
Gln Ala Gly Cys Asp Ser Val Asp Glu Leu Thr Leu Gln Ser Pro Leu 2660 2665 2670		
Val Leu Gly Ala Ser Asp Thr Val Gln Val Arg Val Val Val Thr Glu 2675 2680 2685		
Thr Glu Glu Pro Gly Thr Arg Thr Val Ser Met His Ser Arg Arg Asp 2690 2695 2700		
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Pro Pro Pro Glu Pro Leu Pro Glu Trp Pro Pro Thr Gly Ala Met Pro 2725 2730 2735		
Leu Asp Val Glu Gly Phe Tyr Asp Glu Leu Ala Ala Gly Gly Tyr His 2740 2745 2750		
Tyr Gly Pro Gln Phe Arg Cys Leu Arg Arg Ala Trp Arg Ala Gly Glu 2755 2760 2765		
Asp Leu Val Ala Glu Ile Ser Leu Pro Glu Gly Thr Asp Val Asp Ala 2770 2775 2780		
Tyr Gly Leu His Pro Gly Leu Phe Asp Ala Ala Val His Ser Val Ala 2785 2790 2795 2800		
Cys Ala Arg Thr Ser Ala Gly Ala Gly Asp Asp Gly Pro Arg Leu Pro 2805 2810 2815		

Phe Ala Phe Ser Asp Val Arg Leu Phe Ala Thr Gly Val Thr Ser Leu
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 Arg Val Arg Ile Asp Pro Gln Asn Ser Ser Trp Gln Ala Trp Asp Glu
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 Asp Ala Asp Gln Phe Ala Val Arg Arg Ala Gly His Leu Phe Arg Val
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 Glu Thr Arg His Glu Ala Leu Ala Gly Pro Ala Pro Ala Ser Trp Ala
 2885 2890 2895
 Val Ile Gly Ala Asp Pro Ala Gly Tyr Ala Ala Ala Leu Glu Ala Thr
 2900 2905 2910
 Gly Ala Gln Val Thr Thr Ala Ala Asp Leu Ala Gly Leu Thr Ser Ala
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 Pro Glu Ala Ala Leu Phe Thr Leu Pro Gly Thr Lys Asp Ala Gly Val
 2930 2935 2940
 Thr Glu Glu Val Pro Thr Ala Val Arg Glu Ala Thr Ala Gln Val Leu
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 Glu Val Leu Gln Asp Trp Leu Thr Asp Gly Arg Phe Asp Asp Ala Arg
 2965 2970 2975
 Leu Val Val Val Ser Arg Glu Ala Glu Asp Gly Asp Leu Leu His Gly
 2980 2985 2990
 Thr Ala Arg Gly Leu Leu Arg Ala Ala Gln Ala Glu His Pro Asp Arg
 2995 3000 3005
 Ile Thr Leu Val Asp Leu Asp Ala His Pro Ala Ser Leu Thr Ala Leu
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 Pro Gly Phe Ala Leu Gly Pro Glu Pro Glu Val Val Val Arg Ala Gly
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 Gly Ser Leu Gly Thr Gly Thr Val Leu Ile Thr Gly Gly Thr Gly Thr
 3060 3065 3070
 Leu Gly Gly Leu Leu Ala Arg His Leu Val Glu Thr His Gly Val Thr
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 Val Asp Ala Asp His Pro Leu Ser Ala Val Val His Ala Ala Gly Ala
 3140 3145 3150
 Leu Asp Asp Gly Val Leu Gly Thr Arg Ser Ala Asp Trp Leu Asp Pro
 3155 3160 3165
 Val Leu Arg Pro Lys Ala Asp Ala Ala Trp His Leu His Glu Leu Thr
 3170 3175 3180

Ala Glu Leu Pro Leu Thr Ala Phe Val Met Phe Ser Ser Ala Ala Ser
 3185 3190 3195 3200
 Val Leu Gly Ala Ala Gly Gln Ala Asn Tyr Ala Ala Ala Asn Gly Phe
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 Leu Asp Ala Leu Ala Ala His Arg Ala Ala Arg Gly Leu Pro Gly Thr
 3220 3225 3230
 Ser Leu Ala Trp Gly Leu Trp Glu His Arg Ser Glu Leu Thr Arg His
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 Thr Gly Ser Pro Ser Arg Ser Ile Ala Ala Val Gly Ala Leu Ser Thr
 3250 3255 3260
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 Leu Ala Val Pro Ile Arg Leu Glu Ser Thr Ser Ser Glu Glu Val Pro
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 Pro Met Leu Arg Gly Leu Val Arg Val Arg Arg Arg Ala Ala Thr Gly
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 Thr Glu Pro Ala Ala Ser Ala Gly Ala Ala Gln Glu Val Arg Gln Leu
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 Ala Glu Leu Gly Ala Asp Glu Arg Gln Arg Arg Val Gln Arg Ile Val
 3330 3335 3340
 Leu Asp Thr Ala Ala Ala Val Leu Gly His Asp Ser His Asp Ala Ile
 3345 3350 3355 3360
 Pro Leu Thr Arg Gly Phe Leu Glu Leu Gly Phe Asp Ser Leu Thr Ala
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 Val Arg Leu Arg Asn Arg Leu Ala Arg Arg Leu Gly Leu Arg Leu Pro
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 Ala Thr Val Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ala His
 3395 3400 3405
 Leu Val Glu His Leu Val Gly Thr Val Asp Pro Thr Ala Gln Ala Met
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 Glu Gln Leu Glu Ala Leu Arg Arg Ser Val His Ala Ala Thr Pro Ala
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 Gly Gly Leu Asp Arg Ala Leu Val Thr Gln Arg Leu Thr Ala Leu Leu
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 Asp Glu Met Arg His Val Asp Gly Pro Gly Gly Thr Glu Gly Pro Asp
 3460 3465 3470
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 Leu Ile Asp Asn Glu Leu Gly Ile Gly Gly Thr Gln
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 Asp Leu Arg Ser Ala Arg Ala Arg Leu Gln Glu Leu Glu Ser Ala Asp
 20 25 30
 Thr Asp Pro Ile Ala Ile Ile Gly Met Gly Cys Arg Leu Pro Gly Gly
 35 40 45
 Val Arg Thr Pro Glu Asp Leu Trp Asp Leu Val Glu Lys Lys His Asp
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 Ala Ile Gly Pro Phe Pro Ala Asp Arg Gly Trp Asp Leu Glu Asn Leu
 65 70 75 80
 Tyr Asp Pro Asp Pro Asp Ala Pro Gly Lys Ala Tyr Val Arg Glu Gly
 85 90 95
 Gly Phe Val His Asp Val Ala Gly Phe Asp Ala Gly Phe Phe Gly Ile
 100 105 110
 Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln His Arg Leu Leu Leu
 115 120 125
 Glu Cys Ser Trp Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro Ser Ser
 130 135 140
 Leu Glu Gly Thr Arg Thr Gly Val Tyr Thr Gly Leu Met Thr His Glu
 145 150 155 160
 Tyr Ala Thr Arg Leu Pro Ser Ile Asp Glu Glu Leu Glu Gly Val Ile
 165 170 175
 Gly Ile Gly Asn Ala Gly Ser Val Ala Ser Gly Arg Val Ser Tyr Thr
 180 185 190
 Leu Gly Leu Asn Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser
 195 200 205
 Ser Leu Val Ala Leu His Leu Ala Ala Gln Ala Leu Arg Gln Gly Gln
 210 215 220
 Cys Thr Leu Ala Leu Ala Gly Gly Ala Ser Val Ile Ala Ala Pro Thr
 225 230 235 240
 Val Phe Ala Thr Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg
 245 250 255
 Cys Lys Ala Phe Ser Ser Thr Thr Asp Gly Thr Gly Phe Gly Glu Gly
 260 265 270
 Val Gly Val Leu Val Leu Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly
 275 280 285
 His Glu Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly
 290 295 300
 Ala Ser Ser Gly Phe Thr Ala Pro Asn Gly Pro Ser Gln Gln Asp Val
 305 310 315 320
 Ile Arg Glu Ala Leu Ala Asp Gly Arg Leu Thr Pro Ala Asp Val Asp
 325 330 335
 Val Val Glu Gly His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu
 340 345 350
 Ala Gln Ala Leu Leu Ala Thr Tyr Gly Arg Gly Arg Asp Ala Asp Arg
 355 360 365

Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile Gly His Thr Gln Ala
 370 375 380
 Ala Ala Gly Val Ala Ser Val Ile Lys Met Val Gln Ala Met Gln Ala
 385 390 395 400
 Gly Val Leu Pro Arg Thr Leu His Val Asp Glu Pro Ser Gly Glu Val
 405 410 415
 Asp Trp Asp Ser Gly Ala Val Arg Leu Leu Thr Glu Ala Arg Glu Trp
 420 425 430
 Pro Ser Gly Glu Gly Arg Val Arg Arg Ala Gly Val Ser Ser Phe Gly
 435 440 445
 Ile Ser Gly Thr Asn Ala His Val Ile Leu Glu Glu Pro Pro Ala Glu
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 Asp Ala Leu Pro Glu Pro Glu Ala Gly Asp Val Val Pro Trp Val Leu
 465 470 475 480
 Ser Ala Arg Ser Ala Glu Ala Leu Arg Glu Gln Ala Ala Arg Leu Ala
 485 490 495
 Ser Val Ala Gly Gly Leu Asn Val Val Asp Val Gly Trp Ser Leu Ala
 500 505 510
 Ser Thr Arg Ala Ala Phe Glu His Arg Ala Val Val Val Gly Gly Asp
 515 520 525
 Arg Glu Glu Leu Leu Gly Lys Leu Ser Ser Val Ser Gly Val Glu Val
 530 535 540
 Gly Val Gly Val Gly Ala Gly Gly Gly Val Val Leu Val Phe Ala Gly
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 Gln Gly Cys Gln Trp Val Gly Met Gly Arg Glu Leu Leu Gly Ser Ser
 565 570 575
 Leu Val Phe Ala Glu Ser Met Arg Glu Cys Ala Ala Ala Leu Ser Pro
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 Phe Val Asp Phe Ser Val Val Asp Val Leu Gly Ser Ala Gly Glu Leu
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 Gly Arg Val Glu Val Val Gln Pro Ala Leu Trp Ala Val Met Val Ser
 610 615 620
 Leu Ala Arg Val Trp Arg Ser Trp Gly Val Pro Val Ala Ala Val Val
 625 630 635 640
 Gly His Ser Gln Gly Glu Ile Ala Ala Ala Thr Val Ala Gly Ala Leu
 645 650 655
 Ser Val Gly Asp Ala Ala Arg Val Val Ala Leu Arg Ser Arg Leu Ile
 660 665 670
 Ala Glu Arg Leu Ser Gly Leu Gly Gly Met Val Ser Val Ala Leu Ser
 675 680 685
 Arg Glu Arg Val Val Ser Leu Ile Ala Gly Val Pro Gly Val Ser Val
 690 695 700
 Ala Ala Val Asn Gly Ser Ser Ser Thr Val Val Ser Gly Glu Ala Ala
 705 710 715 720
 Gly Leu Glu Arg Val Leu Ala Ala Cys Val Ser Ser Gly Val Arg Ala
 56

				725					730					735		
Arg	Arg	Ile	Asp 740	Val	Asp	Tyr	Ala	Ser 745	His	Ser	Val	Gln	Val 750	Glu	Leu	
Ile	Arg	Glu 755	Glu	Leu	Leu	Gly	Val 760	Leu	Asp	Gly	Ile	Val 765	Pro	Arg	Ser	
Gly	Glu 770	Ile	Pro	Phe	Val	Ser 775	Thr	Val	Thr	Gly	Glu 780	Arg	Ile	Asp	Thr	
Val 785	Glu	Leu	Gly	Ala	Glu 790	Tyr	Trp	Tyr	Arg	Asn 795	Leu	Arg	Gln	Thr	Val 800	
Glu	Phe	Gln	Ser	Val 805	Val	Glu	Gly	Leu	Val 810	Ala	Gln	Gly	Cys	Arg 815	Val	
Phe	Leu	Glu	Ser 820	Ser	Pro	His	Pro	Val 825	Leu	Thr	Val	Gly	Ile 830	Glu	Glu	
Ser	Ala	Asp 835	Arg	Val	Val	Ala	Leu 840	Glu	Ser	Leu	Arg	Arg 845	Gly	Glu	Gly	
Gly	Leu 850	Arg	Arg	Leu	Val	Asp 855	Ala	Ala	Gly	Glu	Ala 860	Trp	Val	Arg	Gly	
Val 865	Pro	Ile	Asp	Trp	Ala 870	Gly	Met	Leu	Ala	Gly 875	Gly	Arg	Arg	Val	Asp 880	
Leu	Pro	Thr	Tyr	Pro 885	Phe	Gln	His	Gln	Pro 890	Tyr	Trp	Leu	Asp	Ser 895	Pro	
Arg	His	Pro	Ala 900	Gly	Asp	Val	Thr	Gly 905	Pro	Gly	Asp	Asp	Glu 910	Phe	Trp	
Ala	Ala	Val 915	Glu	His	Gly	Glu	Ala 920	Thr	Glu	Leu	Ala	Asp 925	Leu	Leu	Arg	
Arg	Ser 930	Ala	Ala	Glu	Pro	Gly 935	Gln	Asp	Leu	His	Ala 940	Pro	Val	Ala	Ala	
Leu 945	Leu	Pro	Thr	Leu	Ala 950	Thr	Trp	Arg	Arg	Asp 955	Arg	Gln	Arg	Arg	Ala 960	
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Pro	Ser	Tyr	Asp 980	Arg	Val	Leu	Ser	Gly 985	Arg	Trp	Ala	Val	Val 990	Val	Pro	
Ala	Gly	His 995	Glu	Asp	Asp	Pro 1000	Val	Val	Asp	Trp	Val	Cys 1005	Ser	Ala	Leu	
Arg 1010	Asp	His	Gly	Gly	Glu 1015	Pro	Glu	Arg	Met	Val	Leu 1020	Gly	Pro	Arg	Glu	
Ser 1025	Arg	Ser	Ala	Leu 1030	Ala	Thr	Arg	Leu	Ala 1035	Ala	Asp	Pro	Pro	Gly	Gly 1040	
Val	Val	Ser	Leu 1045	Leu	Gly	Leu	Ser	Gly 1050	Ala	Ala	His	Pro	Asp	His 1055	Glu	
Val	Leu	Pro 1060	Ser	Ala	Val	Ala	Gly	Thr 1065	Val	Leu	Leu	Ala 1070	Gln	Ala	Leu	
Ser	Asp 1075	Gly	Ala	Val	Arg	Ala 1080	Pro	Val	Trp	Thr	Leu 1085	Thr	Arg	Asn	Gly	

Val Ser Ala Thr Ala Thr Asp Pro Val Ala Pro Thr His Ala Ala Gln
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 Val Trp Ala Val Ala Arg Val Ala Gly Leu Glu His Pro Glu Ala Trp
 1105 1110 1115 1120
 Gly Gly Leu Leu Asp Leu Pro Asp Arg Leu Asp Asp Arg Ala Ala Ala
 1125 1130 1135
 Arg Phe Ala Ala Val Leu Ser Ala Gly Glu Asp Glu Asp Gln Leu Ala
 1140 1145 1150
 Leu Arg Asp Ala Gly Leu Leu Ala Arg Arg Leu Val Arg Ala Pro Val
 1155 1160 1165
 Pro Arg Asp Ala Val Thr Ala Gly Trp Gln Pro Arg Asp Thr Ala Leu
 1170 1175 1180
 Val Thr Gly Gly Thr Gly Gly Leu Gly Gly Gln Val Ala Arg Trp Leu
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 Ala Ala Ala Gly Val Arg His Leu Val Leu Val Ser Arg Arg Gly Ala
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 Glu Ala Glu Gly Ala Asp Arg Leu Arg Asp Asp Leu Thr Ala Leu Gly
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 Val Gln Val Thr Phe Gly Ala Cys Asp Val Ala Asp Arg Ala Ala Leu
 1235 1240 1245
 Ser Ala Leu Leu Asp Arg Val Gln Glu Asp Gly Pro Pro Ile Arg Thr
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 Val Val His Ala Ala Gly Ser Gly Arg Ala Ala Arg Leu Leu Asp Thr
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 Asp Ala Glu Glu Thr Ala Ala Val Leu Arg Ala Lys Ser Ala Gly Ala
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 Arg Asn Leu His Glu Leu Leu Asp Asp Val Asp Ala Phe Val Leu Phe
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 Ser Ser Gly Ala Gly Val Trp Gly Ser Ser Ala Gln Gly Ala Tyr Ala
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 Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Gln Arg Arg Gly Gln
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 Gly Arg Pro Ala Thr Ser Val Ala Trp Gly Ala Trp Ala Gly Asp Gly
 1345 1350 1355 1360
 Met Thr Ala Ala Ala Gly Glu Glu Trp Trp Ser Arg Gln Gly Leu Arg
 1365 1370 1375
 Phe Met Ala Pro Glu Ala Ala Leu Asp Ala Leu Arg Gln Ala Val Asp
 1380 1385 1390
 Arg Ala Glu Ser Thr Leu Val Val Ala Asp Ile Asp Trp Lys Thr Phe
 1395 1400 1405
 Ala Pro Leu Phe Thr Ser Ala Arg Ser Arg Pro Leu Ile Thr Asp Ile
 1410 1415 1420
 Pro Glu Ala Arg Pro Glu Pro Arg Pro Glu Gly Ala Asp Gln Pro Thr
 1425 1430 1435 1440
 Gln Gly Leu Val Ala Lys Leu Ala Val Leu Ser Ala Asp Glu Arg Arg
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Arg Ala Leu Leu Ala Glu Val Arg Ala Gln Ala Ala Val Val Leu Gly
 1460 1465 1470
 His Pro Gly Ala Asp Ala Val Pro Val Asp Arg Pro Phe Arg Glu Leu
 1475 1480 1485
 Gly Phe Asp Ser Leu Ser Ala Val Lys Leu Arg Asn Arg Ile Val Ala
 1490 1495 1500
 Ala Thr Gly Leu Glu Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr
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 Ser Thr Ala Leu Ala Ala Tyr Leu Gly Ala Arg Leu Gly Ile Asp Gly
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 Ala Pro Ala Gly Ser Thr Leu Leu Glu Asp Leu Ala Arg Leu Glu Ser
 1540 1545 1550
 Thr Val Ala Thr Leu Thr Ala Ala Pro Leu Ala Glu Thr Val Pro Asp
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 Ala Arg Asp Arg Ala Ala Leu Thr Thr Arg Leu Arg Ala Leu Leu Glu
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 Arg Trp Asp Gln Ala Asp Gly Glu Asp Gln Ala Ala Ala Arg Glu Glu
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Phe Gly Arg Ser
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 35 40 45
 Val Arg Ser Pro Glu Glu Phe Trp Asn Leu Leu Asp Glu Gly Val Asp
 50 55 60
 Ala Val Ala Gly Phe Pro Glu Asp Arg Gly Trp Asp Leu Glu Asn Leu
 65 70 75 80
 Tyr Asp Pro Asp Pro Asp Glu Pro Gly Lys Cys Tyr Ala Arg Glu Gly
 85 90 95
 Gly Phe Leu Tyr Asp Ala Gly Glu Phe Asp Ala Ala Phe Phe Gly Ile
 100 105 110
 Ser Pro Arg Glu Ala Leu Ser Met Asp Pro Gln Gln Arg Leu Leu Leu
 115 120 125
 Glu Cys Ser Trp Ser Ala Leu Glu Arg Ala Gly Ile Asp Pro Gly Ser
 130 135 140
 Leu Arg Gly Lys Asp Val Gly Val Tyr Val Gly Ala Trp Asn Ser Asn
 59

145					150					155				160
Tyr	Gly	Arg	Gly	Gly ₁₆₅	Gly	Ala	Glu	Ser	Ser ₁₇₀	Glu	Gly	His	Leu	Leu ₁₇₅ Thr
Gly	Asn	Ala	Ser ₁₈₀	Ser	Val	Val	Ser	Gly ₁₈₅	Arg	Val	Ala	Tyr	Val ₁₉₀	Leu Gly
Leu	Glu	Gly ₁₉₅	Pro	Ala	Val	Thr	Ile ₂₀₀	Asp	Thr	Ala	Cys	Ser ₂₀₅	Ser	Ser Leu
Val	Gly ₂₁₀	Leu	His	Leu	Ala	Ala ₂₁₅	Gln	Ala	Leu	Arg	Ser ₂₂₀	Gly	Glu	Cys Gly
Leu	Ala	Leu	Ala	Gly	Gly ₂₃₀	Val	Thr	Val	Met	Ser ₂₃₅	Thr	Pro	Leu	Ser Leu ₂₄₀
Val	Ser	Phe	Ser	Arg ₂₄₅	Gln	Arg	Gly	Leu	Ala ₂₅₀	Gln	Asp	Gly	Arg	Ser ₂₅₅ Lys
Ala	Phe	Ser	Ala ₂₆₀	Asp	Ala	Asp	Gly	Met ₂₆₅	Gly	Met	Ala	Glu	Gly ₂₇₀	Val Gly
Val	Leu	Val ₂₇₅	Leu	Glu	Arg	Leu	Ser ₂₈₀	Glu	Ala	Arg	Arg	Asn ₂₈₅	Gly	His Glu
Val	Leu ₂₉₀	Ala	Val	Leu	Arg	Ser ₂₉₅	Ser	Ala	Val	Asn	Gln ₃₀₀	Asp	Gly	Ala Ser
Asn	Gly	Leu	Ser	Ala	Pro ₃₁₀	Asn	Gly	Pro	Ala	Gln ₃₁₅	Gln	Arg	Val	Ile Gln ₃₂₀
Ser	Ala	Leu	Thr	Val ₃₂₅	Gly	Arg	Leu	Ala	Pro ₃₃₀	Ser	Asp	Ile	Asp	Val ₃₃₅ Val
Glu	Ala	His	Gly ₃₄₀	Thr	Gly	Thr	Ala	Leu ₃₄₅	Gly	Asp	Pro	Ile	Glu ₃₅₀	Ala Gln
Ala	Leu	Leu ₃₅₅	Ala	Thr	Tyr	Gly	Arg ₃₆₀	Gly	Arg	Asp	Ala	Asp ₃₆₅	Arg	Pro Leu
Trp	Leu ₃₇₀	Gly	Ser	Val	Lys	Ser ₃₇₅	Asn	Ile	Gly	His	Thr ₃₈₀	Gln	Ala	Ala Ala
Gly	Val	Ala	Gly	Val	Ile ₃₉₀	Lys	Met	Val	Leu	Ala ₃₉₅	Leu	Arg	Lys	Gly Val ₄₀₀
Leu	Pro	Arg	Thr	Leu ₄₀₅	His	Val	Asp	Glu	Pro ₄₁₀	Thr	Gly	Glu	Val	Asp Trp ₄₁₅
Asp	Ser	Gly	Ala ₄₂₀	Val	Arg	Leu	Leu	Thr ₄₂₅	Glu	Ala	Arg	Glu	Trp ₄₃₀	Pro Ser
Gly	Glu	Gly ₄₃₅	Arg	Val	Arg	Arg	Ala ₄₄₀	Gly	Val	Ser	Ser	Phe ₄₄₅	Gly	Ile Ser
Gly	Thr	Asn	Ala	His	Val	Ile ₄₅₅	Val	Glu	Glu	Ala	Pro ₄₆₀	Glu	Glu	Glu Pro
Arg	Pro	Glu	Ala	Pro	Ser ₄₇₀	Val	Asp	Val	Val	Pro ₄₇₅	Trp	Val	Leu	Ser Ala ₄₈₀
Arg	Ser	Ala	Glu	Ala ₄₈₅	Leu	Arg	Glu	Gln	Ala ₄₉₀	Ala	Arg	Leu	Ala	Ser Val ₄₉₅
Ala	Gly	Gly	Leu	Asn	Val	Val	Asp	Val ₅₀₅	Gly	Trp	Ser	Leu	Ala	Ser Thr ₅₁₀

Arg Ala Ala Phe Glu His Arg Ala Val Val Val Gly Arg Asp Ser Glu
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 Glu Leu Val Ser Gly Leu Ser Ser Val Ser Gly Val Glu Val Gly Val
 530 535 540
 Gly Val Gly Ala Gly Gly Gly Val Val Leu Val Phe Ala Gly Gln Gly
 545 550 555 560
 Cys Gln Trp Val Gly Met Gly Arg Glu Leu Leu Gly Ser Ser Leu Val
 565 570 575
 Phe Ala Glu Ser Met Arg Glu Cys Ala Ala Ala Leu Ser Pro Phe Val
 580 585 590
 Asp Phe Ser Val Val Asp Val Leu Gly Ser Ala Gly Glu Leu Gly Arg
 595 600 605
 Val Glu Val Val Gln Pro Ala Leu Trp Ala Val Met Val Ser Leu Ala
 610 615 620
 Arg Val Trp Arg Ser Trp Gly Val Pro Val Ala Ala Val Val Gly His
 625 630 635 640
 Ser Gln Gly Glu Ile Ala Ala Ala Thr Val Ala Gly Ala Leu Ser Val
 645 650 655
 Gly Asp Ala Ala Arg Val Val Ala Leu Arg Ser Arg Leu Ile Ala Glu
 660 665 670
 Arg Leu Ser Gly Leu Gly Gly Met Val Ser Val Ala Leu Ser Arg Glu
 675 680 685
 Arg Val Val Ser Leu Ile Ala Gly Val Pro Gly Val Ser Val Ala Ala
 690 695 700
 Val Asn Gly Ser Ser Ser Thr Val Val Ser Gly Glu Ala Ala Gly Leu
 705 710 715 720
 Glu Arg Val Leu Ala Ala Cys Val Ser Ser Gly Val Arg Ala Arg Arg
 725 730 735
 Ile Asp Val Asp Tyr Ala Ser His Ser Val Gln Val Glu Leu Ile Arg
 740 745 750
 Glu Glu Leu Leu Gly Val Leu Asp Gly Ile Val Pro Arg Ser Gly Glu
 755 760 765
 Ile Pro Phe Val Ser Thr Val Thr Gly Glu Arg Ile Asp Thr Val Glu
 770 775 780
 Leu Gly Ala Glu Tyr Trp Tyr Arg Asn Leu Arg Gln Thr Val Glu Phe
 785 790 795 800
 Gln Ala Ser Val Gln Thr Leu Leu Ala Gln Gly His Gln Val Phe Leu
 805 810 815
 Glu Ser Ser Pro His Pro Val Leu Thr Val Gly Ile Glu Glu Thr Val
 820 825 830
 His Glu Ser Ala Ala Gln Ala Val Val Leu Gly Ser Leu Arg Arg Asp
 835 840 845
 Glu Gly Ala Leu Thr Arg Leu Val Thr Ser Ala Gly Glu Ala Trp Ala
 850 855 860
 Arg Gly Val Pro Val Asp Trp Ala Gly Met Leu Ala Gly Gly Arg Arg
 865 870 875 880

Val Glu Leu Pro Thr Tyr Pro Phe Leu Arg Glu Arg Leu Trp Leu Glu
 885 890 895
 Pro Ser Arg Ser Arg Thr Gly Asn Leu Asn Met Ala Gly Leu Val Glu
 900 905 910
 Ala Gly His Glu Ile Leu Pro Ala Ala Val Glu Leu Pro Gly Glu Gln
 915 920 925
 Trp Val Trp Thr Gly Glu Leu Ser Leu Ser Ala Tyr Pro Trp Leu Ala
 930 935 940
 Asp His Gln Val Leu Gly Gln Thr Leu Val Pro Gly Val Ala Trp Val
 945 950 955 960
 Glu Leu Ala Leu His Ala Gly His Gln Leu Gly Phe Gly Ser Val Glu
 965 970 975
 Glu Leu Thr Leu Gln Ala Pro Leu Val Leu Gly Glu Ser Asp Ala Val
 980 985 990
 Gln Val Arg Val Val Val Ser Asp Leu Gly Glu Ser Asp Arg Arg Ala
 995 1000 1005
 Val Ser Val His Ser Arg Gly Asp Asp Gln Thr Trp Val Thr His Ala
 1010 1015 1020
 Glu Gly Phe Leu Thr Ala Lys Gly Ala Gln Pro Glu Thr Met Ala Val
 1025 1030 1035 1040
 Trp Pro Pro Ser Gly Ala Glu Pro Val Glu Ala Asp Gly Phe Tyr Glu
 1045 1050 1055
 Arg Leu Ala Asp Ala Gly Tyr His Tyr Gly Pro Val Phe Gln Gly Val
 1060 1065 1070
 Ser Lys Val Trp Arg Ala Gly Glu Glu Ile Tyr Ala Glu Val Gly Leu
 1075 1080 1085
 Leu Asp Asp Ala Asp Val Asp Gly Phe Gly Ile His Pro Ala Leu Leu
 1090 1095 1100
 Asp Ala Ala Leu Gln Thr Ala Tyr Val Ala Gln Arg Gly Pro Ala Glu
 1105 1110 1115 1120
 Thr Lys Leu Pro Phe Ala Phe Gly Asp Val Gln Leu Phe Ala Thr Gly
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 Ala Arg Ser Leu Arg Val Arg Val Ser Pro Ala Ala Gln Gln Gly Met
 1140 1145 1150
 Ala Trp Glu Ala Trp Asp Pro Thr Gly Leu Pro Val Phe Ser Leu Gly
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 Tyr Leu Ala Thr Arg Pro Val Asp Arg Gly Gln Leu Thr Val Lys Arg
 1170 1175 1180
 Pro Glu Ser Leu Phe Lys Val Ala Trp Asp Glu Thr Val Pro Val Val
 1185 1190 1195 1200
 Gly Asn Ala Thr Ala Ala His Gly Val Val Leu Gly Asp Asp Pro Phe
 1205 1210 1215
 Ala Leu Gly Ala Ala Leu Arg Ala Ala Gly Trp Glu Val Gly Ala Ala
 1220 1225 1230
 Pro Glu Pro Ala Ser Ala Asp Thr Ala Ala Glu Val Leu Leu Leu Pro

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Cys Thr Ala Pro Gly Glu Pro Asp Ala Asp Leu Pro Thr Ala Val Arg		
1250	1255	1260
Ala Val Thr Ala Arg Val Leu Gly Val Leu Gln Glu Trp Leu Ala Asp		
1265	1270	1275 1280
Glu Arg Leu Ala Gly Thr Arg Leu Ala Val Val Thr Arg Asn Ala Leu		
	1285	1290 1295
Pro Gly Asp Leu Leu His Ser Pro Val Trp Gly Leu Val Arg Ser Ala		
	1300	1305 1310
Gln Thr Glu Asn Pro Gly Arg Ile Thr Leu Val Asp Leu Asp Asp His		
	1315	1320 1325
Pro Asp Ser Ala Ala Val Leu Ala Glu Ala Val Gln Ser Asp Glu Pro		
	1330	1335 1340
Arg Ile Met Val Arg Glu Gly Arg Pro Thr Ala Ala Arg Leu Val Arg		
1345	1350	1355 1360
Ala Thr Ala Pro Glu Leu Val Pro Pro Ala Gly Ala Asp Ala Trp Arg		
	1365	1370 1375
Leu Glu Ile Thr Glu Pro Gly Thr Phe Asp Asn Leu Thr Leu Gly Val		
	1380	1385 1390
Tyr Pro His Ala Glu Lys Thr Leu Ala Asp Asn Glu Val Arg Val Ala		
	1395	1400 1405
Val His Ala Gly Gly Leu Asn Phe His Asp Val Val Ala Ala Leu Gly		
	1410	1415 1420
Met Val Glu Asp Asp Leu Thr Leu Gly Arg Glu Ala Ala Gly Val Val		
1425	1430	1435 1440
Val Glu Val Gly Asp Ala Val Pro Asp Leu Thr Pro Gly Asp His Val		
	1445	1450 1455
Met Gly Ile Leu Ser Ser Gly Phe Gly Pro Leu Ala Val Thr Asp His		
	1460	1465 1470
Arg Tyr Leu Ala Arg Met Pro Glu Gly Trp Thr Phe Ala Gln Ala Ala		
	1475	1480 1485
Ser Val Pro Ala Ala Phe Leu Thr Ala Tyr Tyr Gly Leu Cys Asp Leu		
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Gly Gly Ile Arg Ala Gly Asp Arg Val Leu Ile His Ala Ala Ala Gly		
1505	1510	1515 1520
Gly Val Gly Met Ala Ala Val Gln Ile Ala Arg His Leu Gly Ala Glu		
	1525	1530 1535
Val Phe Gly Thr Ala Ser Pro Arg Lys Trp Gly Ala Leu Arg Ala Leu		
	1540	1545 1550
Gly Leu Asp Asp Ala His Leu Ser Ser Ser Arg Thr Leu Asp Phe Glu		
	1555	1560 1565
Gln Glu Phe Leu Asp Ala Thr Asp Gly Arg Gly Val Asp Leu Val Leu		
	1570	1575 1580
Asn Ser Leu Ala Arg Glu Phe Val Asp Ala Ser Leu Arg Leu Met Pro		
1585	1590	1595 1600

Gly Gly Gly Arg Phe Val Asp Met Gly Lys Thr Asp Ile Arg Arg Pro
 1605 1610 1615
 Glu Gln Val Ala Glu Asp His Gly Gly Val Ala Tyr Gln Ala Phe Asp
 1620 1625 1630
 Leu Val Glu Ala Gly Pro Gln Arg Thr Gly Glu Met Leu Ala Glu Ile
 1635 1640 1645
 Val Arg Leu Phe Gln Ala Gly Ala Phe Arg Pro Leu Pro Ile Thr Gln
 1650 1655 1660
 Trp Asp Val Arg Arg Ala Pro Glu Ala Phe Arg His Ile Ser Gln Ala
 1665 1670 1675 1680
 Lys His Ile Gly Lys Ile Val Leu Thr Val Pro Arg Pro Ile Asp Thr
 1685 1690 1695
 Asp Gly Thr Val Met Val Thr Gly Ala Thr Gly Thr Leu Gly Gly Phe
 1700 1705 1710
 Val Ala Arg His Leu Val Thr His His Gly Ile Arg Arg Leu Leu Leu
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 Val Ser Arg Ser Ala Glu Arg Thr Asp Leu Val Arg Glu Leu Thr Glu
 1730 1735 1740
 Leu Gly Ala Asp Val Thr Trp Ala Ser Cys Asp Leu Ala Asp Ala Thr
 1745 1750 1755 1760
 Ala Val Glu Glu Thr Val Arg Ser Val Asp Glu Arg His Pro Leu Val
 1765 1770 1775
 Ala Val Val His Ser Ala Gly Val Leu Asp Asp Gly Val Ile Asp Lys
 1780 1785 1790
 Gln Ser Pro Glu Arg Leu Asp Thr Val Met Arg Pro Lys Val Asp Ala
 1795 1800 1805
 Ala Trp Asn Leu His Arg Leu Leu Asp Asn Ala Pro Leu Ala Asp Phe
 1810 1815 1820
 Val Leu Phe Ser Ser Ala Ser Gly Val Leu Gly Gly Ala Gly Gln Ser
 1825 1830 1835 1840
 Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp Ala Leu Ala Glu His Arg
 1845 1850 1855
 Arg Ala Gln Gly Leu Ala Gly Gln Ala Leu Ala Trp Gly Leu Trp Ser
 1860 1865 1870
 Asp Arg Ser Thr Met Thr Gly Gln Leu Gly Ser Thr Glu Leu Ala Arg
 1875 1880 1885
 Ile Ala Arg Asn Gly Val Ala Glu Met Ser Glu Thr Glu Gly Leu Ala
 1890 1895 1900
 Leu Phe Asp Ala Ala Arg Asp Thr Ala Glu Ala Val Leu Leu Pro Met
 1905 1910 1915 1920
 His Leu Asp Val Ala Arg Leu Arg Ser Arg Asn Gly Glu Val Pro Ala
 1925 1930 1935
 Val Phe Arg Arg Leu Ile His Ala Thr Ala Arg Arg Thr Ala Ser Thr
 1940 1945 1950
 Ala Val Arg Ser Ala Gly Leu Glu Gln Gln Leu Ala Ser Leu Ser Gly
 1955 1960 1965

Pro Glu Arg Thr Glu Leu Leu Leu Gly Leu Val Arg Asp His Ala Ala
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 Ala Val Leu Gly His Gly Thr Ser Asp Ala Val Ser Pro Asp Arg Pro
 1985 1990 1995 2000
 Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn
 2005 2010 2015
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 2020 2025 2030
 Asp His Pro Ser Pro Thr Ala Leu Ala Gly His Leu Ala Gly Leu Leu
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 Gly Ala Ala Thr Pro Ser Ala Ala Glu Pro Val Leu Ala Ala Val Gly
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 Glu Asp Val Thr Ile Gln Leu Glu Ala Leu Leu Ala Glu Trp Arg Glu
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 Ala Ala Glu Lys Arg Ala Pro Glu Ala Val Gly Asp Glu Asp Leu Ser
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 Glu Ala
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 Pro Gly Asp Val Arg Thr Pro Glu Arg Phe Trp Glu Leu Leu Asp Thr
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 Gly Thr Asp Ala Leu Thr Pro Leu Pro Thr Asp Arg Gly Trp Asn Leu
 65 70 75 80
 Asp Thr Ala Phe Asp Asp Glu Arg Pro Tyr Arg Arg Glu Gly Gly Phe
 85 90 95
 Leu Tyr Asp Ala Gly Arg Phe Asp Ala Glu Phe Phe Gly Ile Ser Pro
 100 105 110
 Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ser
 115 120 125
 Ser Trp Glu Ala Ile Glu His Ala Arg Ile Asp Pro Arg Ser Leu His
 130 135 140
 Gly Ser Arg Thr Gly Val Trp Phe Gly Thr Ile Gly Gln Asp Tyr Phe
 65

145					150					155				160
Ser	Leu	Phe	Ala	Ala 165	Ser	Gly	Gly	Glu	His 170	Ala	Asn	Tyr	Leu	Ala 175
Ala	Cys	Ser	Ala 180	Ser	Val	Met	Ser	Gly 185	Arg	Val	Ser	Tyr	Val 190	Leu Gly
Leu	Glu	Gly 195	Pro	Ala	Val	Thr	Val 200	Asp	Thr	Ala	Cys	Ser 205	Ser	Ser Leu
Val	Ala 210	Leu	His	Ser	Ala	Val 215	Gln	Ala	Leu	Arg	Ser 220	Gly	Glu	cys Glu
Leu	Ala	Leu	Ala	Gly	Gly 230	Ala	Thr	Val	Met	Ala 235	Thr	Pro	Thr	Val Phe 240
Thr	Ala	Phe	Ser	His 245	Gln	Arg	Gly	Leu	Ala 250	Gly	Asp	Gly	Arg	Cys Lys 255
Ala	Phe	Ala	Ala 260	Gly	Ala	Asp	Gly	Ala 265	Gly	Phe	Ala	Glu	Gly 270	Val Gly
Val	Leu	Val 275	Leu	Glu	Arg	Leu	Ser 280	Val	Ala	Arg	Arg	Asn 285	Gly	His Arg
Val	Leu 290	Ala	Val	Val	Arg	Gly 295	Ser	Ala	Val	Asn	Gln 300	Asp	Gly	Ala Ser
Asn 305	Gly	Leu	Thr	Ala	Pro 310	Asn	Gly	Pro	Ser	Gln 315	Gln	Arg	Val	Ile Arg 320
Ala	Ala	Leu	Ala	Asn 325	Ala	Arg	Leu	Ala	Pro 330	Glu	Asp	Val	Asp	Ala Val 335
Glu	Gly	His	Gly 340	Thr	Gly	Thr	Ser	Leu 345	Gly	Asp	Pro	Ile	Glu 350	Ala Gln
Ala	Leu	Leu 355	Ala	Thr	Tyr	Gly	Arg 360	Gly	Arg	Asp	Ala	Glu 365	Arg	Pro Leu
Trp	Leu 370	Gly	Ser	Val	Lys	Ser 375	Asn	Ile	Gly	His	Ala 380	Gln	Ala	Ala Ala
Gly 385	Val	Ala	Gly	Val	Ile 390	Lys	Met	Val	Leu	Ala 395	Met	Glu	Lys	Gly Arg 400
Leu	Pro	Arg	Thr	Leu 405	His	Val	Asp	Glu	Pro 410	Ser	Gly	Glu	Val	Asp Trp 415
Asp	Ser	Gly	Ala 420	Val	Arg	Leu	Leu	Thr 425	Glu	Ala	Arg	Asp	Trp 430	Pro Ser
Gly	Glu	Gly 435	Arg	Val	Arg	Arg	Ala 440	Gly	Val	Ser	Ser	Phe 445	Gly	Ile Ser
Gly	Thr 450	Asn	Ala	His	Val	Ile 455	Ile	Glu	Glu	Pro	Gln 460	Glu	Glu	Glu Ala
Ala 465	Pro	Asp	Ser	Ser	Ala 470	Ser	Gly	Ala	Val	Pro 475	Trp	Val	Leu	Ser Ala 480
Arg	Ser	Ala	Glu	Ala 485	Leu	Gln	Ala	Leu	Ala 490	Ser	Gln	Leu	Ala	Asp His 495
Ser	Ala	Lys	Ser 500	Ser	Pro	Val	Asp	Val 505	Gly	Trp	Ser	Leu	Val 510	Ser Thr

Arg Ala Ala Phe Glu His Arg Ala Val Val Val Gly Arg Gly Arg Asp
 515 520 525
 Glu Leu Val Arg Gly Leu Ser Glu Val Ala Gln Gly Arg Gly Val Arg
 530 535 540
 Gly Val Ala Ser Ser Ala Ser Gly Gly Leu Ala Phe Val Phe Ala Gly
 545 550 555 560
 Gln Gly Ser Gln Arg Leu Gly Met Gly Arg Gly Leu Tyr Glu Arg Phe
 565 570 575
 Pro Val Phe Ala Glu Ala Phe Asp Glu Val Cys Gly Arg Val Gly Pro
 580 585 590
 Gly Val Arg Glu Val Val Phe Gly Ser Asp Ala Gly Glu Leu Asp Arg
 595 600 605
 Thr Val Trp Ala Gln Ala Gly Leu Phe Ala Leu Glu Val Ala Leu Phe
 610 615 620
 Arg Leu Leu Glu Ser Trp Gly Val Arg Pro Gly Cys Leu Ile Gly His
 625 630 635 640
 Ser Val Gly Glu Leu Ser Ala Ala Cys Val Ala Gly Leu Trp Ser Leu
 645 650 655
 Glu Asp Ala Cys Arg Val Val Ala Ala Arg Ala Arg Leu Met Gln Ala
 660 665 670
 Leu Pro Ala Gly Gly Val Met Val Ala Val Arg Ala Glu Ala Gly Glu
 675 680 685
 Leu Ala Gly Phe Leu Gly Glu Asp Val Val Ile Ala Ser Val Asn Ala
 690 695 700
 Pro Gly Gln Val Val Ile Ala Gly Pro Glu Gly Gly Val Glu Arg Val
 705 710 715 720
 Val Ala Ala Cys Gly Ala Arg Ser Arg Arg Leu Ala Val Ser His Ala
 725 730 735
 Phe His Ser Pro Leu Val Glu Pro Met Leu Gly Glu Phe Arg Arg Val
 740 745 750
 Val Glu Ser Val Ala Phe Gly Val Pro Ser Leu Arg Val Val Ser Asn
 755 760 765
 Val Thr Gly Ala Trp Val Asp Pro Glu Glu Trp Gly Thr Pro Glu Tyr
 770 775 780
 Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Ala
 785 790 795 800
 Thr Leu Leu Asp Ala Gly Val Arg Thr Phe Val Glu Leu Gly Pro Ala
 805 810 815
 Gly Thr Leu Thr Ser Met Val Ser His Cys Ala Asp Ala Thr Ala Thr
 820 825 830
 Ser Val Thr Ala Val Pro Thr Leu Arg Pro Asp His Asp Glu Ser Arg
 835 840 845
 Thr Val Leu Ser Ala Ala Ala Ser Leu Tyr Val Gln Gly His Pro Val
 850 855 860
 Asp Trp Ala Pro Leu Phe Pro Arg Ala Arg Thr Val Asp Leu Pro Thr
 865 870 875 880

Tyr Pro Phe Gln His Gln His Tyr Trp Met Glu Ser Ala Ala Arg Pro
885 890 895
Thr Val Glu Asp Thr Pro Arg Glu Pro Leu Asp Gly Trp Thr His Arg
900 905 910
Ile Asp Trp Val Pro Leu Val Asp Glu Glu Pro Ala Pro Val Leu Ala
915 920 925
Gly Thr Trp Leu Leu Val Arg Pro Glu Glu Gly Pro Arg Pro Leu Ala
930 935 940
Asp Ala Val Ala Asp Ala Leu Thr Arg His Gly Ala Ser Val Val Glu
945 950 955 960
Ala Ala Arg Val Pro His Gln Ser Asp Thr Glu Leu Thr Gly Val Val
965 970 975
Ser Leu Leu Gly Pro Gly Ala Asp Gly Asp Gly Gly Leu Asp Ala Thr
980 985 990
Leu Arg Leu Val Gln Asp Leu Ala Thr Ala Gly Ser Thr Ala Pro Leu
995 1000 1005
Trp Ile Val Thr Ser Gly Ala Val Ala Val Gly Thr Ser Asp Thr Val
1010 1015 1020
Pro Asn Pro Glu Gln Ala Thr Leu Trp Gly Leu Ala Arg Ala Ala Ala
1025 1030 1035 1040
Thr Glu Trp Pro Gly Leu Gly Ala Ala Arg Ile Asp Leu Pro Ala Asp
1045 1050 1055
Leu Thr Glu Gln Val Gly Arg Arg Leu Cys Ala Arg Leu Leu Asp Arg
1060 1065 1070
Ser Glu Gln Glu Thr Ala Val Arg Gln Ala Gly Val Phe Ala Arg Arg
1075 1080 1085
Leu Val Arg Ala Arg Thr Ser Asp Gly Arg Trp Thr Pro Arg Gly Thr
1090 1095 1100
Val Leu Val Thr Gly Gly Thr Gly Ala Leu Ala Gly His Val Ala Arg
1105 1110 1115 1120
Trp Leu Ala Glu Glu Gly Ala Glu His Ile Val Leu Ala Gly Arg Arg
1125 1130 1135
Gly Pro Asp Gly Gln Gly Ala Glu Ala Leu Arg Ala Asp Leu Val Ala
1140 1145 1150
Ala Gly Val Lys Ala Thr Ile Val Arg Cys Asp Val Ala Asp Arg Asp
1155 1160 1165
Ala Val Arg Leu Leu Leu Asp Ala His Arg Pro Ser Ala Ile Val His
1170 1175 1180
Thr Ala Gly Val Val Asp Asp Gly Leu Leu Thr Ser Leu Thr Pro Ala
1185 1190 1195 1200
Gln Val Glu Arg Val Leu Arg Pro Lys Leu Leu Gly Ala Arg Asn Leu
1205 1210 1215
His Glu Leu Thr Arg Asp Arg Glu Leu Asp Ala Phe Val Leu Phe Ser
1220 1225 1230
Ser Leu Ala Gly Val Leu Gly Gly Ala Gly Gln Ala Asn Tyr Ala Ala
68

1235	1240	1245
Ala Asn Ala Tyr Leu Asp	Ala Leu Ala Ala His	Arg Thr Ala His Gly
1250	1255	1260
Leu Pro Ala Ala Ser	Leu Ala Trp Gly Pro Trp	Glu Gly Asp Gly Met
1265	1270	1275
Ala Ala Ala Gln Glu	Ala Ala Asp Arg	Leu Arg Arg Ser Gly Leu Thr
1285	1290	1295
Pro Leu Pro Pro	Glu Gln Ala Val	Arg Ala Leu Gly Arg Gly His Gly
1300	1305	1310
Pro Leu Val Val	Ala Asp Ala Asp	Trp Ala Arg Leu Ala Ala Gly Ser
1315	1320	1325
Thr Gln Arg Leu Leu	Asp Glu Leu Pro Glu Val	Arg Ala Val Arg Pro
1330	1335	1340
Ala Glu Pro Ala Val	Gly Gln Arg Pro Asp	Leu Pro Ala Arg Leu Ala
1345	1350	1355
Gly Arg Pro Ala Glu	Glu Gln Ser Ala Val	Leu Leu Glu Ala Val Arg
1365	1370	1375
Glu Glu Ile Ala Ala	Val Leu Arg Tyr Ala Asp	Pro Ala Arg Ile Gly
1380	1385	1390
Ala Asp His Glu Phe	Leu Ala Leu Gly Phe Asp	Ser Leu Thr Ser Ile
1395	1400	1405
Glu Leu Arg Asn Arg	Leu Ala Thr Arg Ile Gly	Leu Thr Leu Pro Ala
1410	1415	1420
Thr Leu Thr Leu Glu	Gln Arg Thr Pro Ala Gly	Leu Ala Ala His Leu
1425	1430	1435
Arg Glu Arg Ile Ala	Asp Arg Pro Val Gly	Ser Gly Ala Val Pro Val
1445	1450	1455
Pro Gly Ser Ala Asp	Val Pro Glu Ala Gly	Gly Gly Ser Gly Leu Gly
1460	1465	1470
Glu Leu Trp Gln Glu	Ala Asp Arg His Gly	Arg Arg Leu Glu Phe Ile
1475	1480	1485
Asp Val Leu Thr Ala	Ala Ala Ala Phe Arg	Pro Ala Tyr Arg Glu Pro
1490	1495	1500
Ala Glu Leu Glu Leu	Pro Pro Leu Arg Leu Thr	Ser Gly Gly Asp Glu
1505	1510	1515
Pro Pro Leu Phe Cys	Ile Pro Ser His Leu Gly	Lys Ala Asp Pro His
1525	1530	1535
Lys Phe Leu Arg Phe	Ala Ala Ala Leu Arg	Gly Arg Arg Asp Val Phe
1540	1545	1550
Val Leu Arg Gln Pro	Gly Phe Val Pro Gly	Gln Pro Leu Pro Ala Gly
1555	1560	1565
Leu Asp Val Leu Leu	Asp Thr His Ala Arg	Ala Met Ala Gly His Asp
1570	1575	1580
Arg Pro Val Leu Leu	Gly Tyr Ser Ala Gly	Gly Leu Ala Ala Gln Ala
1585	1590	1595
		1600

Leu Ala Ala Arg Leu Ala Glu Leu Gly Arg Pro Pro Ala Ala Val Val
 1605 1610 1615
 Leu Val Asp Thr Tyr Ala Pro Asp Glu Thr Glu Val Met Ala Arg Ile
 1620 1625 1630
 Gln Gly Ala Met Glu Gln Gly Gln Arg Asp Arg Asp Gly Arg Thr Gly
 1635 1640 1645
 Ala Ala Phe Gly Glu Ala Trp Leu Thr Ala Met Gly His Tyr Phe Gly
 1650 1655 1660
 Phe Asp Trp Thr Pro Cys Pro Val Asp Val Pro Val Leu His Val Arg
 1665 1670 1675 1680
 Ala Gly Asp Pro Met Thr Gly Met Pro Val Glu Gly Arg Trp Gln Ala
 1685 1690 1695
 Arg Trp Asn Leu Pro His Thr Ala Val Asp Val Pro Gly Asp His Phe
 1700 1705 1710
 Thr Met Met Glu Asp His Ala Pro Arg Thr Ala Asp Thr Val His Asp
 1715 1720 1725
 Trp Leu Gly Thr Ala Val Arg Arg Pro Glu Arg Thr Arg Asp
 1730 1735 1740

<210> 8
 <211> 264
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 8
 Met Thr Gly Thr Asn Thr His Ser Asp Val Trp Ile Arg Gln Tyr Arg
 1 5 10 15
 Pro Ala His Pro Thr Ala Pro Gln Leu Ile Cys Leu Pro His Ala Gly
 20 25 30
 Gly Ser Ala Thr Phe Tyr His Pro Val Ala Ala Ala Leu Ala Pro Arg
 35 40 45
 Cys Asp Val Leu Ala Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg Ala
 50 55 60
 Glu Lys Pro Leu Glu Asp Ile Asp Glu Leu Ala Asn Gln Leu Phe Pro
 65 70 75 80
 Val Leu Arg Ala Arg Val His Gln Pro Val Ala Leu Phe Gly His Ser
 85 90 95
 Met Gly Ala Thr Leu Ala Phe Glu Leu Ala Arg Arg Phe Glu Ser Ala
 100 105 110
 Gly Ile Ser Leu Glu Ala Leu Leu Val Ser Ala Arg Pro Ala Pro Ser
 115 120 125
 Arg Gln Arg Thr Gly Gly Thr Val His Leu Leu Ser Asp Glu Glu Leu
 130 135 140
 Val Ala Glu Leu Arg Thr Leu Asp Gly Thr Ala Glu Gln Val Phe His
 145 150 155 160
 Asp Glu Glu Leu Val Arg Met Ala Leu Pro Ala Ile Arg Gly Asp Tyr
 165 170 175
 Arg Ala Ala Glu Thr Tyr Arg Tyr Arg Pro Gly Pro Lys Leu Arg Cys
 180 185 190

Pro Ile His Ala Leu Thr Gly Asp Asp Asp Pro Met Val Thr Pro Val
195 200 205
Glu Ala Arg Ala Trp Ser Glu His Thr Asp Gly Pro Phe Thr Leu Asp
210 215 220
Thr Phe Ala Gly Gly His Phe Tyr Leu Leu Glu His Arg Asp Ala Ile
225 230 235 240
Leu Gly Ile Ile Ala Glu His Leu Arg Thr Cys Ser Arg Ala Pro Gly
245 250 255
Asp Arg Ser Gly Leu Thr Arg Glu
260

<210> 9
<211> 265
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 9
Met Ser Leu Glu Leu Thr Asp Arg Val Met Met Val Thr Gly Ala Gly
1 5 10 15
Ser Gly Ile Gly Arg Ala Ala Ala Arg Leu Leu Val Gly His Gly Ala
20 25 30
Arg Val Val Leu Val Gly Arg Thr Glu Ser Ala Leu Thr Glu Thr Thr
35 40 45
Ala Gly Leu Pro Ser Ser His His Leu Val Val Pro Cys Asp Val Gly
50 55 60
Asp Asp Lys Gln Val Ala Asp Cys Val Ala Arg Ala Val Ser Arg Phe
65 70 75 80
Gly Arg Leu Asp Gly Ala Phe Asn Asn Ala Gly Thr Phe Gly Ser Phe
85 90 95
Gly Pro Leu His Gln Asp Thr Ala Asp Asn Phe Asp Arg Val Ile Ala
100 105 110
Thr Asn Leu Arg Gly Val Trp Ser Cys Met Arg Gly Gln Ile Glu Ala
115 120 125
Met Leu Thr Ala Gly Gly Gly Ala Ile Val Asn Cys Ala Ser Val Ala
130 135 140
Gly His Ile Gly His Ala Gln Ser Pro Leu Tyr Ser Ala Thr Lys His
145 150 155 160
Ala Val Ile Gly Leu Ser Lys Ser Val Ala Leu Gln Tyr Ala Gly Asp
165 170 175
Gly Ile Arg Val Asn Val Val Ser Pro Gly Ser Thr Asp Thr Pro Met
180 185 190
Leu Arg Ser Leu Tyr Ala Asp Pro Ser Ala Leu Ala Gln Arg Ala Arg
195 200 205
Arg Ala Pro Leu Gly Arg Leu Gly Lys Cys Glu Glu Val Ala Asn Ala
210 215 220
Val Val Trp Leu Leu Ser Pro Leu Ala Ala Tyr Val Thr Gly Gln Thr
225 230 235 240
Leu Gly Val Asp Gly Gly Val Thr Ala Gly Ser Ala Ile Pro Arg Thr
71

	245	250	255
Asn Ala Thr	Pro Glu Gly Gln His Arg		
	260	265	
<210>	10		
<211>	250		
<212>	PRT		
<213>	Streptomyces parvulus Tu4055		
<400>	10		
Met Thr Ala Arg His Asp Val Ala Leu Val Thr Gly Ala Gly Ser Gly			
1	5	10	15
Ile Cys Ala Glu Val Ala Arg Gly Leu Ala Ala Arg Gly Leu Arg Val			
	20	25	30
Val Leu Leu Asp Lys Asp Ala Glu Ala Val His Arg Val Ala Asp Gly			
	35	40	45
Leu Gly Asp Arg Leu Ala Arg Asp Pro Leu Val Ala Asp Val Thr Asp			
	50	55	60
Pro His Ala Leu Ala Ser Ala Val Asp Ser Leu Ala Pro Gln His Arg			
	65	70	75
Pro Gly Val Leu Val Asn Gly Val Gly Gly Asp Thr Arg Ala Arg Ser			
	85	90	95
Val Thr Glu Leu Thr Glu Ala Asp Leu Gln Glu Ala Val Thr His Asn			
	100	105	110
Leu Ala Ser Val Phe Thr Met Thr Arg Leu Cys Val Pro Ala Met Val			
	115	120	125
Ala Ala Gly Trp Gly Arg Val Val Asn Leu Ala Ser Val Ala Gly Arg			
	130	135	140
Thr Tyr Thr Arg Phe Ser Asn Ala Ala Tyr Val Ala Ala Lys Ala Gly			
	145	150	155
Val Ile Gly Phe Thr Lys Gln Cys Ala Tyr Glu Leu Ala Pro His Gly			
	165	170	175
Val Thr Val Asn Ala Val Ala His Gly Val Ile Gly Thr Glu Arg Ile			
	180	185	190
Arg Arg Ala Trp Glu Asp Lys Pro Pro Gln Trp Thr Ala Asp Arg Val			
	195	200	205
Ser His Ile Pro Ala Gly Arg Phe Gly Ser Val Ala Glu Ala Ala Gly			
	210	215	220
Met Val Cys His Leu Cys Gly Glu Asp Ala Gly Tyr Thr Thr Gly Thr			
	225	230	235
Val Val Asp Val Asn Gly Gly Leu His Ile			
	245	250	

<210> 11
 <211> 390
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 11
 Met Ile Arg Arg Val Arg Leu His Thr Ala Val Val Pro Met Ala Ala
 1 5 10 15

Ala Phe Asp His Ala Thr Arg Ser Arg Arg Ser Ala Ala Ser Leu Leu
20 25 30
Val Glu Ile Glu Leu Ala Gly Thr Arg Gly Trp Gly Glu Gly Ala Pro
35 40 45
Arg Asp Tyr Val Thr Gly Glu Thr Leu Asp Gly Ala Val Arg Ala Val
50 55 60
Gln Ala Cys Asp Pro Gly Glu Leu Ala Glu Arg Ile Glu Trp Arg Asp
65 70 75 80
Phe Glu Ser Ala Val Ala Ser Ile Ala Gln Leu Pro Leu Thr Gly Leu
85 90 95
Val Asp Gly Ser Ser Ala Ala Ala Ala Val Glu Ile Ala Leu Leu Asp
100 105 110
Ala Val Cys Arg His Phe Ala Arg Pro Leu Ala Asp Val Leu Arg Val
115 120 125
Leu Ala Pro Pro Ala Arg Ser Arg Arg Asp Gly Pro Thr Ser Val Ser
130 135 140
Leu Val Ile His Leu Ser Arg Asp Val Ala Thr Val Leu Asp Ala Leu
145 150 155 160
Thr Pro Arg Ala Leu Ala Ala Leu Arg His Val Lys Ile Lys Val Ala
165 170 175
Asp Pro Ala Gly Ala Val Asp Arg Leu Thr Ala Ala Gln Asp Arg Leu
180 185 190
Pro Ala Asp Thr Arg Val Ser Leu Asp Val Asn Gly Ala Trp Thr Ala
195 200 205
Glu Glu Ala Glu Lys Val Ala Gly Glu Leu Asp Gly Val Gly Trp Val
210 215 220
Glu Glu Pro Leu Pro Pro Arg Ser Trp Pro Glu Leu Gly Arg Leu Arg
225 230 235 240
Arg Ala Thr Gly Leu Pro Val Met Leu Asp Glu Ser Cys Thr Gly Pro
245 250 255
Ala Asp Leu His Ala Ala Ala Thr Ser Gly Ala Ala Ser His Ile Asn
260 265 270
Val Arg Leu Ser Lys Cys Gly Gly Phe Leu Ala Ala Ala Arg Leu Ala
275 280 285
Leu Arg Ala Asp Glu Leu Gly Val Gly Cys Gln Leu Gly Val His Val
290 295 300
Ala Glu Val Gly Pro Leu Trp Ala Ala Gly Arg Thr Leu Ala Thr Ala
305 310 315 320
Trp Asp Leu Trp Gln Thr Val Glu Ala Gly Arg Ala Asp Glu Trp Phe
325 330 335
Pro Val Pro Leu Thr Thr Pro Ala Phe Thr Val Asp Arg Ser Leu His
340 345 350
Arg Val Glu Pro Leu Thr Gly Pro Gly Thr Gly Ile Glu Pro Thr Glu
355 360 365
Glu Leu Leu Arg His Thr Arg Cys Ala Ala Thr Trp Glu Ser Gly Gly
370 375 380

Gly Trp Arg Arg Asn Thr
385 390

<210> 12
<211> 272
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 12
Met Pro Thr Thr Ser Met Leu Thr Ala Ala Asp Gly Thr Gly Leu Thr
1 5 10 15
Leu His His Trp Thr Thr Pro Gly Ala Thr Ser Ala Val Phe Tyr Leu
20 25 30
His Gly Ile Gln Ser His Ala Gly Trp Leu Phe Glu Thr Gly Pro Glu
35 40 45
Leu Asn Ala Arg Gly Ile Asp Val Tyr Ala Leu Asp Arg Arg Gly Ser
50 55 60
Gly Arg Ser Glu Gly Pro Arg Gly His Leu Pro Ser Ala Asp Leu Val
65 70 75 80
Leu Asp Asp Tyr Ala Arg Ala Leu Asp Ala Val Thr Ala Glu Val Gly
85 90 95
Gly Ala Gly Pro Val Ala Leu Gly Gln Ser Leu Gly Gly Ser Val Leu
100 105 110
Ala Ala Leu Trp Cys Thr Arg Asp Leu Pro Val Arg Arg Leu Val Leu
115 120 125
Cys Ala Pro Ala Leu Gly Gln Gln Arg Ala Arg His Thr Ala Asp Thr
130 135 140
Leu Ala Glu Arg Arg Ala Leu Thr Gly Ser Gly Leu Arg Pro Val Gly
145 150 155 160
Leu Ala Asp Gly Asp Tyr Thr Asp Leu Pro Arg Tyr Arg Glu Phe Leu
165 170 175
Thr Gly Asp His Leu Met Leu Arg Glu Val Thr Ser Ala Thr Gln Ala
180 185 190
Thr Leu Val His Leu Glu Asp His Tyr Ala Arg Gly Ala Pro Arg Thr
195 200 205
Arg Leu Pro Val Asp Leu Ala Leu Pro Thr His Asp Pro Ile Ile Asp
210 215 220
Leu Ser Ala Ala Arg Ala Met Leu Arg Arg Leu Thr Ser Ala Val His
225 230 235 240
Glu Glu Val Phe Ala Thr Asp Arg His Tyr Val Glu Phe Thr Ser Ala
245 250 255
Arg Thr Ala Tyr Trp Asp Trp Leu Ala Thr Arg Leu Lys Glu Glu Ala
260 265 270

<210> 13
<211> 539
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 13
Met Lys Val Phe His Ala Leu Ala Asp Ala Leu Thr Ala His Gly Val
74

1	5	10	15
Asp Thr Val Phe Gly Leu Met Gly Asn Ala Asn Leu Leu Tyr Leu Pro	20	25	30
Ala Phe Ala Asp Ala Gly Gly Arg Phe Val Ala Val Ala His Glu Ala	35	40	45
Gly Ala Val Ala Met Ala Asp Gly Arg Ala Arg Met Cys Gly Gly Ile	50	55	60
Gly Val Ala Ser Val Thr His Gly Pro Ala Phe Thr Asn Ala Leu Thr	65	70	75
Pro Leu Val Glu Ala Ala Arg Ser His Ser Gln Val Leu Leu Ile Thr	85	90	95
Gly Asp Pro Pro Pro Val Pro Thr His Phe His His Phe Asp Ile Ala	100	105	110
Thr Val Ala Ala Ala Ala Gly Ala Gly Tyr Glu Arg Val His Arg Pro	115	120	125
Ala Ser Leu Val Ala Asp Leu Asn Arg Ala Val Gln Arg Ile Val Ala	130	135	140
Glu Arg Arg Pro Val Val Leu Asn Val Pro Ile Asp Leu Met Gln Ala	145	150	155
Glu Ala Gly Glu Gln Ala Pro Val Thr Leu Pro Val Ala Pro Gly Pro	165	170	175
Leu Ala Ala Pro Glu Ala Glu Ala Leu Asp Gly Ala Leu Gly Leu Ile	180	185	190
Gly Ser Ala Lys Arg Pro Leu Val Leu Ala Gly His Gly Ala Ala Val	195	200	205
Ala Gly Ala Arg Glu Ala Leu Val Glu Leu Ala Asp Arg Thr Gly Ala	210	215	220
Ala Leu Ala Thr Thr Val Leu Gly Lys Glu Met Phe Ala Gly His Pro	225	230	235
Arg Asp Val Gly Ile Phe Gly Ser Leu Ala His Ser Val Ala Ser Thr	245	250	255
Val Ile Ala Glu Ser Asp Cys Val Ile Ala Phe Gly Ala Ser Leu Asn	260	265	270
Met Trp Thr Val Leu Asn Gly Glu Leu Leu Arg Gly Lys Arg Val Val	275	280	285
His Val Asp Thr Asp Pro Ala Arg Phe Gly Ser Tyr Ser Pro Val Asp	290	295	300
Glu Pro Val Ala Gly Asp Ala Arg Arg Thr Ala Glu Thr Met Asn Val	305	310	315
Leu Leu Asp Gln Ala Gly Val Thr Ala Ala Asn Gly Ala Trp Ala Glu	325	330	335
Arg Val Ala Gly Gln Leu Ala Gly Phe Ser Pro Gln Asp Asp Val Asp	340	345	350
Asp Arg Ser Gly Ala Glu Thr Val Asp Ile Arg Thr Ala Met Ile Arg	355	360	365

Leu Asp Arg Ile Leu Pro Ala Glu Arg Ser Val Val Ser Asp Ile Gly
 370 375 380
 Arg Phe Asp Val Gly Val Trp Pro Tyr Leu Arg Val Ala Asp Pro Leu
 385 390 395 400
 His Phe Thr Val Met Gly Gly Phe Gly Ser Ile Gly Leu Gly Val Ala
 405 410 415
 Gly Ala Ile Gly Ala Ala Thr Ala Gly Thr Gly Arg Pro Val Val Ala
 420 425 430
 Ala Val Gly Asp Gly Gly Phe Met Met His Leu Ser Glu Phe Thr Thr
 435 440 445
 Ala Val Arg Tyr Arg Leu Pro Leu Val Val Val Val Leu Asn Asp Gly
 450 455 460
 Ala Tyr Gly Ala Glu His Tyr Lys Leu Arg Asn His Gly Tyr Asp Pro
 465 470 475 480
 Ala Tyr Ser Ala Phe Ala Trp Pro Asp Leu Ala Gly Leu Ala Thr Ala
 485 490 495
 Met Gly Ala Arg Ala Leu Thr Val Arg Lys Ala Glu Glu Leu Asp Ala
 500 505 510
 Val Gly Asp Leu Leu Ser Thr Leu Glu Gly Pro Leu Leu Val Asp Val
 515 520 525
 Arg Leu Asp Pro Asp Val Asn Leu Val Arg Tyr
 530 535

<210> 14
 <211> 683
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 14
 Met Arg Gly Ala Arg Glu Asn Ser Met Thr Arg Ala Gly Pro Leu Glu
 1 5 10 15
 Gly Ile Ala Val Leu Met Ala Gly Arg Ser Thr Pro Ala Ala Leu Leu
 20 25 30
 Gly Arg Leu Leu Ala Asp Leu Gly Ala Arg Val Val Thr Leu Cys Arg
 35 40 45
 Ser Pro Asp His Gly Gly Pro Phe Glu Arg Trp Leu His Ser Ala Ala
 50 55 60
 Gln Ser Ala Ser Gly Trp Asp Gln Ala Ser Arg Leu Leu Gln Thr Ala
 65 70 75 80
 Asp Val Leu Val Cys Asp Ala Glu Gly Asp Glu Arg Leu Ala Ala Leu
 85 90 95
 Gly Leu Gly Ala Pro Glu Leu Pro His Arg Ser Pro Glu Leu Val Ala
 100 105 110
 Val Arg Leu Ser Ala Phe Gly Leu Thr Gly Pro Leu Arg Asp Ala Pro
 115 120 125
 Ala Thr Glu Arg Thr Leu Gln Ala Leu Ala Gly Leu Thr Ser Ala Thr
 130 135 140
 Gly Thr Glu Gly Glu Pro Ser Val Leu Ser Val Val Gly Leu Ala Ser
 145 150 155 160

Arg Thr Ala Ala Leu Ser Gly Leu Ile Ala Val Val Ala Gly Leu Ile
 165 170 175
 Gly Arg Glu Arg Gly Gly Gly Gly Asp Tyr Leu Asp Ile Ala Glu Phe
 180 185 190
 Asp Ser Leu Phe Thr Leu Thr Gly Thr Leu Leu Pro Ser Val Ala Leu
 195 200 205
 Ala Gly Arg Pro Pro Arg Arg Thr Gly Asn Arg His Gly Met Ala Ala
 210 215 220
 Pro Trp Asn Ser Tyr Thr Cys Gln Asp Ala Pro Val Val Ile Cys Thr
 225 230 235 240
 Met Gly Glu Pro Ile Trp His Arg Leu Thr Ala Val Leu Gly Arg Arg
 245 250 255
 Asp Leu Pro Asp Asp Pro Arg Phe Ala Asp Thr Ala Ala Arg Val Arg
 260 265 270
 Asn Ala Asp Glu Leu Asp Glu Ile Leu Gly Lys Trp Thr Ala Gly Gln
 275 280 285
 Arg Ala Val Asp Val Val Thr Ala Leu Arg Ala Ala Gly Ile Pro Cys
 290 295 300
 Ala Gln Val Ala Ala Pro Glu Glu Val Arg Asp Gly Ala Ala Ala Arg
 305 310 315 320
 Arg Arg Gly Leu Val Thr Asp Pro Ser Gly Thr Pro Gly Ser Pro Leu
 325 330 335
 Arg Ser Leu Ile Pro Ala Val Thr Asp Gly Pro Met Pro Arg Gln Gly
 340 345 350
 Gly Leu Trp Glu Pro Ile Ala Arg Gly Thr Pro Pro Leu Arg Gly Val
 355 360 365
 Arg Leu Leu Glu Val Gly Ser Tyr Thr Ala Gly Pro His Ala Gly Arg
 370 375 380
 Leu Leu Ala Gln Leu Gly Ala Asp Val Leu Lys Val Glu Pro Pro His
 385 390 395 400
 Gly Glu Gly Ser Arg Arg Leu Ala Gln Gln Val Ala Gly Val Gly Tyr
 405 410 415
 Leu Tyr Tyr Val Asn Asn Ala Gly Lys Arg Ser Cys Arg Leu Asp Leu
 420 425 430
 Ala Asp Ala Glu Asp Arg Ala Gly Phe Glu Arg Leu Leu Ala Gly Cys
 435 440 445
 Asp Ile Val Leu Thr Asn Leu Ala Ala Asp Thr Leu Thr Ala Gln Gly
 450 455 460
 Leu Ala Pro Asp Gln Ile Leu Ser Arg His Gly Val Val His Cys Thr
 465 470 475 480
 Val Thr Gly His Gly Leu Ala Ala Ala Asp Arg Ser Val Asp Thr Val
 485 490 495
 Ile Gln Ala Glu Ser Gly Ile Met Arg Leu Val Gly Gly Pro Gly Ala
 500 505 510
 Gly Leu Arg Thr Pro Val Ser Ser Ala Asp Val Leu Gly Ala Tyr Leu
 77

515					520					525					
Ala	Ala	Ala	Ala	Ala	Val	Val	Ser	Thr	Tyr	Val	Arg	Leu	Arg	Thr	Glu
	530					535					540				
His	Gly	Cys	Ala	Ala	Asp	Val	Ala	Leu	Phe	Asp	Ser	Ala	Val	Trp	Leu
545					550					555					560
Thr	Gln	Asp	Arg	Trp	Phe	Thr	Ala	Pro	Pro	Ala	Arg	Ala	Pro	His	Leu
				565					570					575	
Val	Arg	Ala	Ala	Asp	Gly	Thr	Val	Leu	Val	Asp	Ala	Glu	Gly	Pro	Pro
			580					585					590		
Pro	Arg	Ala	Glu	Gly	Pro	Val	Ala	Ala	Val	Leu	Asp	Ala	Ala	Ala	Ala
		595					600					605			
Val	Gly	Val	Pro	Ala	Ala	Pro	Leu	His	Asp	Leu	Thr	Arg	Ala	Val	Arg
	610					615					620				
His	Pro	Gln	Val	Leu	Ala	Arg	Arg	Met	Ala	Val	Ala	Arg	Asp	Cys	Ala
625					630					635					640
Gly	Thr	Thr	Val	Leu	Ile	Thr	Gly	Asn	His	Leu	Arg	Ser	Leu	Leu	Arg
				645					650					655	
Glu	Asp	Pro	Pro	Pro	Thr	Cys	Ala	Pro	Val	Asp	Gln	Asn	Asp	Pro	Val
			660					665					670		
Trp	Leu	Gln	Pro	Ala	Pro	Thr	Glu	Gly	Gln	Gln					
		675					680								

<210> 15
 <211> 426
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 15															
Met	Thr	Thr	Arg	Arg	Arg	Gln	Arg	His	Pro	Ala	Leu	Ser	Pro	Ser	Cys
1					5				10					15	
Pro	Ser	Val	Pro	Phe	Pro	Leu	Leu	Glu	Thr	Glu	Phe	Val	Leu	Met	Pro
			20					25					30		
Ser	Phe	Pro	Val	Arg	Arg	Ser	Val	Pro	Asp	Thr	Pro	Pro	Ala	Glu	His
		35					40					45			
Leu	Glu	Leu	Leu	Lys	Glu	Ser	Gly	Gly	Val	Cys	Pro	Phe	Thr	Met	Glu
	50					55					60				
Asp	Gly	Arg	Pro	Ala	Trp	Leu	Ala	Ala	Ser	His	Asp	Ala	Val	Arg	Ser
65					70					75					80
Leu	Leu	Ala	Asp	Arg	Arg	Ile	Ser	Asn	Asn	Pro	Ala	Lys	Thr	Pro	Pro
				85					90					95	
Phe	Ser	Gln	Arg	Glu	Ala	Leu	Gln	Lys	Glu	Arg	Gly	Gln	Phe	Ser	Arg
			100					105					110		
His	Leu	Phe	Asn	Met	Asp	Ser	Pro	Glu	His	Asp	Val	Ala	Arg	Arg	Met
		115					120					125			
Ile	Ala	Glu	Asp	Phe	Thr	Pro	Arg	His	Ala	Glu	Ala	Val	Arg	Pro	Tyr
	130					135					140				
Phe	Glu	Glu	Val	Phe	Gly	Glu	Ile	Val	Asp	Glu	Val	Val	His	Lys	Gly
145					150					155					160

Pro Pro Ala Glu Met Ile Glu Ser Phe Ala Phe Pro Val Ala Thr Arg
 165 170 175
 Thr Ile Cys Lys Val Leu Asp Ile Pro Glu Asp Asp Cys Glu Tyr Phe
 180 185 190
 Gln Lys Arg Thr Glu Gln Ile Ile Glu Met Asp Arg Gly Glu Glu Asn
 195 200 205
 Leu Glu Ala Val Val Glu Leu Arg Arg Tyr Val Asp Ser Val Met Gln
 210 215 220
 Gln Arg Thr Arg Lys Pro Gly Asp Asp Leu Leu Ser Arg Met Ile Val
 225 230 235 240
 Lys Ala Lys Ala Ser Lys Glu Ile Glu Leu Ser Asp Ala Asp Leu Val
 245 250 255
 Asp Asn Ala Met Phe Leu Leu Val Ala Gly His Glu Pro Ser Ala Asn
 260 265 270
 Met Leu Gly Leu Gly Val Leu Ala Leu Ala Glu Phe Pro Asp Val Ala
 275 280 285
 Glu Glu Leu Arg Ala Glu Pro His Leu Trp Pro Gly Ala Ile Asp Glu
 290 295 300
 Met Leu Arg Tyr Tyr Thr Ile Ala Arg Ala Thr Lys Arg Val Ala Ala
 305 310 315 320
 Ala Asp Ile Glu Tyr Glu Gly His Thr Ile Lys Glu Gly Asp Ala Val
 325 330 335
 Ile Val Leu Leu Asp Thr Ser Asn Arg Asp Pro Lys Val His Ala Glu
 340 345 350
 Pro Asn Arg Leu Asp Ile His Arg Ser Ala Gly Asn His Leu Ala Phe
 355 360 365
 Ser His Gly Pro His Gln Cys Leu Gly Lys His Leu Val Arg Val Gln
 370 375 380
 Leu Glu Ile Ala Leu Arg Ala Val Ala Glu Arg Leu Pro Gly Leu Arg
 385 390 395 400
 Leu Asp Ile Ala Lys Glu Asp Ile Pro Phe Arg Gly Asp Ala Leu Ser
 405 410 415
 Tyr Gly Pro Arg Gln Leu Arg Val Thr Trp
 420 425

<210> 16
 <211> 454
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 16
 Met Glu Lys Thr Asp Val Asp Arg Leu Arg Thr Leu Asp Arg Glu His
 1 5 10 15
 Met Trp Tyr Pro Trp Thr Pro Met Thr Glu Trp Met Ala Arg Asp Gln
 20 25 30
 Leu Val Val Glu Arg Ala Glu Gly Cys Trp Leu Ile Asp Ala Asp Gly
 35 40 45
 Lys Arg Tyr Leu Asp Gly Arg Ser Ser Met Gly Met Asn Leu His Gly
 50 55 60

His Gly Arg Ser Glu Ile Val Glu Ala Leu Val Ala Gln Ala Arg Lys
 65 70 75 80
 Ala Gly Glu Thr Thr Leu Tyr Arg Val Ser His Pro Ala Ala Val Glu
 85 90 95
 Leu Ala Ala Arg Leu Ala Ser Met Ala Pro Ala Gly Leu Gln Arg Val
 100 105 110
 Phe Phe Ala Glu Ser Gly Ser Thr Ala Val Glu Thr Ala Leu Lys Ala
 115 120 125
 Ala Tyr Ala Tyr Trp Val Ala Lys Gly Glu Pro Gln Arg Ser Thr Phe
 130 135 140
 Val Ser Met Glu Gly Gly Tyr His Gly Glu Thr Leu Gly Thr Val Ser
 145 150 155 160
 Leu Arg Gly Thr Asn Gly Glu Gln Val Asp Met Ile Arg Lys Thr Tyr
 165 170 175
 Glu Pro Leu Leu Phe Pro Ser Leu Ser Phe His Gln Pro His Cys Tyr
 180 185 190
 Arg Cys Pro Val Gly Gln Ser Ser Asp Ser Asp Cys Gly Leu Glu Cys
 195 200 205
 Thr Asp Ser Leu Glu Asn Leu Leu Thr Arg Glu Lys Gly Arg Ile Ala
 210 215 220
 Ala Val Ile Val Glu Pro Arg Val Gln Ala Leu Ala Gly Val Ile Thr
 225 230 235 240
 Ala Pro Glu Gly His Leu Ala Lys Val Ala Glu Ile Thr Arg Arg His
 245 250 255
 Gly Val Leu Leu Ile Val Asp Glu Val Leu Thr Gly Trp Ala Arg Thr
 260 265 270
 Gly Pro Thr Phe Ser Cys Glu Ala Glu Gly Val Thr Pro Asp Leu Met
 275 280 285
 Thr Val Gly Lys Ala Leu Thr Gly Gly Tyr Leu Pro Leu Ser Ala Thr
 290 295 300
 Leu Ala Thr Glu Glu Ile Phe Gly Ala Phe Arg Glu Ser Val Phe Leu
 305 310 315 320
 Ser Gly Ser Thr Tyr Ser Gly Tyr Ala Leu Gly Ala Ala Val Ala Leu
 325 330 335
 Ala Ser Leu Asp Leu Phe Glu Lys Glu Asp Val Pro Ala Arg Ala Lys
 340 345 350
 Ala Leu Ala Asp Val Leu Thr Thr Ala Leu Glu Pro Phe Arg Ala Leu
 355 360 365
 Thr His Val Gly Asp Val Arg Gln Leu Gly Leu Ile Ala Gly Val Glu
 370 375 380
 Leu Val Ala Asp Arg Glu Thr Arg Ala Pro Tyr Pro Pro Gln Glu Arg
 385 390 395 400
 Val Val Asp Arg Ile Cys Thr Leu Ala Arg Asp Asn Gly Val Leu Val
 405 410 415
 Asn Ala Val Pro Gly Asp Val Ile Thr Met Leu Pro Ser Pro Ser Met
 80

Thr Asp Ala Leu Glu Pro Val Val His Ala Asp Phe Pro Leu Ser Arg
290 295 300

Ala Pro Glu Ala Val Ala Glu Leu Glu Glu Arg Arg Ala Phe Gly Lys
305 310 315 320

Val Val Ile Arg Thr Ala
325

<210> 18
<211> 556
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 18
Met Thr Gly Asn Thr Thr Ser Ala Ala Phe Leu Arg Arg Thr Gln Asn
1 5 10 15

Ala Leu Ala Met Gln Arg Lys Ile Cys Ala Gln Pro Glu Glu Thr Ala
20 25 30

Glu Arg Val Phe Ser Asp Ile Leu Ser Val Ser Arg Asp Thr Gly Phe
35 40 45

Gly Arg Glu His Gly Leu Ala Gly Val Arg Thr Arg Gln Glu Trp Arg
50 55 60

Arg Ala Val Pro Ile Arg Thr Tyr Asp Glu Leu Ala Pro Tyr Val Glu
65 70 75 80

Arg Gln Phe Ser Gly Glu Arg Arg Val Leu Thr Thr Asp Asp Pro Arg
85 90 95

Ala Phe Leu Arg Thr Ser Gly Ser Thr Gly Arg Ala Lys Leu Val Pro
100 105 110

Thr Thr Asp His Trp Arg Arg Val Tyr Arg Gly Pro Ala Leu Tyr Ala
115 120 125

Gln Trp Gly Leu Tyr Phe Glu Gln Ile Gly Thr His Arg Leu Thr Gly
130 135 140

Asp Glu Val Leu Asp Leu Ser Trp Glu Pro Gly Pro Ile Arg His Arg
145 150 155 160

Leu Arg Gly Phe Pro Val Tyr Ser Ile Thr Glu Arg Pro Val Ser Asp
165 170 175

Asp Pro Asp Asp Trp Asn Pro Pro Trp Arg His Ala Arg Trp Phe Thr
180 185 190

Arg Asp Ala Gly Ala Ala Thr Met Ala Asp Leu Leu Tyr Gly Lys Leu
195 200 205

Leu Arg Leu Ala Ala His Asp Leu Arg Leu Ile Val Ser Val Asn Pro
210 215 220

Ser Lys Ile Val Leu Leu Ala Glu Thr Leu Lys Glu Asn Ala Glu Arg
225 230 235 240

Leu Ile Gln Asp Leu His Asp Gly His Gly Thr Asp Arg Ala Ala Arg
245 250 255

Pro Asp Phe Leu Arg Arg Leu Thr Ala Ala Phe Asp Arg Thr Gly Gly
260 265 270

Arg Pro Leu Leu Thr Asp Leu Trp Pro Gly Leu Arg Leu Leu Val Cys
275 280 285

Trp Asn Ser Ala Ser Ala Ala Leu Tyr Gly Pro Trp Leu Ser Arg Leu
 290 295 300
 Ala Thr Gly Val Ala Ala Leu Pro Phe Ser Thr Thr Gly Thr Glu Gly
 305 310 315 320
 Ile Val Thr Leu Pro Val Asp Asp His Leu Ser Ala Gly Pro Leu Ala
 325 330 335
 Val Asp Gln Gly His Phe Glu Phe Val Pro Trp Gln Asp Leu Asp Asp
 340 345 350
 Gly Ser Pro Leu Pro Glu Asp Thr Pro Thr Leu Gly Tyr Asp Glu Leu
 355 360 365
 Glu Leu Gly Ala Asp Tyr Arg Leu Val Met Ser Gln Ala Asn Gly Leu
 370 375 380
 Tyr Arg Tyr Asp Val Gly Asp Val Tyr Arg Val Val Gly Ala Val Gly
 385 390 395 400
 Ala Thr Pro Arg Leu Glu Phe Leu Gly Arg Ala Gly Phe Gln Ser Ser
 405 410 415
 Phe Thr Gly Glu Lys Leu Thr Glu Ser Asp Val His Thr Ala Val Met
 420 425 430
 Arg Val Leu Gly Ser Glu Arg Thr Asp His Pro His Phe Ser Gly Ile
 435 440 445
 Pro Val Trp Asp Thr Pro Pro His Tyr Leu Val Ala Ile Glu Trp Ala
 450 455 460
 Asp Ala His Gly Thr Leu Asn Val Gln Asp Thr Ala Arg Arg Ile Asp
 465 470 475 480
 Ala Thr Leu Gln Glu Val Asn Val Glu Tyr Ala Asp Lys Arg Arg Ser
 485 490 495
 Gly Arg Leu Arg Pro Leu Gln Ile Leu Pro Leu Val Pro Gly Ala Phe
 500 505 510
 Gly Gln Ile Ala Glu Arg Arg Phe Arg Gln Gly Thr Ala Gly Ala Gln
 515 520 525
 Ile Lys His His Trp Leu Gln Lys Asp Ser Ala Phe Leu Asp Thr Leu
 530 535 540
 Arg Asp Leu Asp Leu Val Arg Ala Arg Pro Gly Thr
 545 550 555

<210> 19
 <211> 305
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 19
 Met Arg Ile Gly Phe Ala Ala Pro Met Ser Gly Pro Trp Ala Thr Pro
 1 5 10 15
 Asp Thr Ala Val His Val Ala Arg Thr Ala Glu Gln Leu Gly Tyr Ala
 20 25 30
 Ser Leu Trp Thr Tyr Gln Arg Val Leu Gly Ala Pro Asp Asp Ser Trp
 35 40 45
 Gly Glu Ala Asn Arg Ser Val His Asp Pro Leu Thr Thr Leu Ala Phe
 83

50 55 60
 Leu Ala Ala His Thr Thr Gly Ile Arg Leu Gly Val Ala Val Leu Ile
 65 70 75 80
 Met Pro Leu His Thr Pro Ala Val Leu Ala Lys Gln Leu Thr Thr Leu
 85 90 95
 Asp Leu Leu Ser Gly Gly Arg Leu Asp Val Gly Leu Gly Asn Gly Trp
 100 105 110
 Ala Ala Glu Glu Tyr Ala Ala Ala Gly Val Thr Pro Thr Gly Leu Ser
 115 120 125
 Arg Arg Ala Glu Asp Phe Leu Ala Cys Leu Arg Ala Leu Trp Gly Glu
 130 135 140
 Gln Thr Val Val Glu His Asp Gly Pro Phe Tyr Arg Val Pro Pro Ala
 145 150 155 160
 Arg Phe Asp Pro Lys Pro Ala Gln Ser Pro His Pro Pro Leu Leu Leu
 165 170 175
 Gly Gly Ala Ala Pro Gly Ala Leu Arg Arg Ala Gly Arg Leu Cys Asp
 180 185 190
 Gly Trp Ile Ala Ser Ser Lys Ala Gly Pro Ala Ala Ile Arg Asp Ala
 195 200 205
 Ile Thr Val Val Arg Asp Ser Ala Glu Arg Thr Gly Arg Asp Pro Ala
 210 215 220
 Thr Leu Arg Phe Val Cys Arg Ala Pro Val Arg Leu Arg Thr Arg Ser
 225 230 235 240
 Ala Pro Asn Glu Pro Pro Leu Thr Gly Thr Ala Glu Thr Ile Arg Ala
 245 250 255
 Asp Leu Ala Ala Leu Ala Asp Thr Gly Leu Thr Glu Ile Phe Leu Asp
 260 265 270
 Pro Asn Phe Asp Pro Glu Ile Gly Ser Pro Asp Ala Pro Thr Gly Asp
 275 280 285
 Val Arg His Arg Val Asp Leu Leu Leu His Glu Leu Ala Pro Ala Asn
 290 295 300
 Trp
 305

<210> 20
 <211> 248
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 20
 Met Leu Ile Ala Arg Ala Ala Val Gly Glu Asp Arg Thr Tyr Ala Arg
 1 5 10 15
 Val Asp Thr Asp Thr Gly Leu Ile His Leu Leu Ala Gly Thr Pro Tyr
 20 25 30
 Asp Glu Ile Arg Pro Thr Gly Glu Thr Arg Pro Leu Ala Glu Ala Arg
 35 40 45
 Leu Leu Ala Pro Val Glu Pro Ser Lys Val Leu Val Ala Gly Arg Asn
 50 55 60

Tyr Gly Asp Val Val Thr Pro Asp Leu Val Val Phe Met Lys Pro Ser
 65 70 75 80
 Thr Ser Val Val Gly Pro Arg Ser Thr Val Leu Leu Pro Ala Glu Ala
 85 90 95
 Lys Gln Val Arg Tyr Glu Gly Glu Leu Ala Val Val Ile Gly Arg Arg
 100 105 110
 Cys Lys Asp Val Pro Glu Asp Thr Ala Asp Gln Ala Val Phe Gly Tyr
 115 120 125
 Thr Cys Ala Asn Asp Val Thr Ala Trp Asp Val Gly Glu Pro Lys Gly
 130 135 140
 His Trp Thr Lys Ala Lys Ser Phe Asp Thr Phe Cys Pro Leu Gly Pro
 145 150 155 160
 Trp Ile Arg Thr Asp Leu Asp Pro Ala Asp Leu Val Leu Arg Thr Thr
 165 170 175
 Val Asn Gly Thr Leu Arg Gln Asp Gly Ser Thr Lys Glu Met Asn Arg
 180 185 190
 Asn Val Arg Ala Leu Val Ser Arg Cys Ser Ser Leu Met Thr Leu Leu
 195 200 205
 Pro Gly Asp Val Ile Leu Thr Gly Thr Pro Ala Gly Ala Gly Val Leu
 210 215 220
 Arg Pro Gly Asp Glu Val Val Val Glu Ile Asp Gly Ile Gly Ser Leu
 225 230 235 240
 Ala Asn Pro Ile Gly Val Ala Lys
 245

<210> 21
 <211> 675
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 21
 Met Ser Val Ile Arg Pro Thr Ala Glu Thr Glu Arg Ala Val Val Val
 1 5 10 15
 Val Pro Ala Gly Thr Thr Cys Ala Asp Ala Val Thr Ala Ala Lys Leu
 20 25 30
 Pro Arg Asn Gly Pro Asn Ala Ile Val Val Val Arg Asp Pro Ser Gly
 35 40 45
 Ala Leu Arg Asp Leu Asp Trp Thr Pro Asp Ser Asp Val Glu Val Glu
 50 55 60
 Ala Val Ala Leu Ser Ser Glu Asp Gly Leu Thr Val Leu Arg His Ser
 65 70 75 80
 Thr Ala His Val Leu Ala Gln Ala Val Gln Gln Leu Trp Pro Glu Ala
 85 90 95
 Arg Leu Gly Ile Gly Pro Pro Ile Glu Asn Gly Phe Tyr Tyr Asp Phe
 100 105 110
 Asp Val Glu Arg Pro Phe Gln Pro Glu Asp Leu Glu Arg Val Glu Gln
 115 120 125
 Arg Met Lys Glu Ile Ile Lys Ser Gly Gln Arg Phe Cys Arg Arg Glu
 130 135 140

Phe Pro Asp Arg Glu Ala Ala Arg Ala Glu Leu Ala Lys Glu Pro Tyr
 145 150 155 160
 Lys Leu Glu Leu Val Asp Leu Lys Gly Asp Val Asp Ala Ala Glu Ala
 165 170 175
 Met Glu Val Gly Gly Ser Asp Leu Thr Ile Tyr Asp Asn Leu Asp Ala
 180 185 190
 Arg Thr Gly Asp Val Cys Trp Ser Asp Leu Cys Arg Gly Pro His Leu
 195 200 205
 Pro Ser Thr Arg Leu Ile Pro Ala Phe Lys Leu Leu Arg Asn Ala Ala
 210 215 220
 Ala Tyr Trp Arg Gly Ser Glu Lys Asn Pro Gln Leu Gln Arg Ile Tyr
 225 230 235 240
 Gly Thr Ala Trp Pro Thr Arg Asp Glu Leu Lys Ser His Leu Ala Ala
 245 250 255
 Leu Glu Glu Ala Ala Lys Arg Asp His Arg Arg Ile Gly Glu Glu Leu
 260 265 270
 Asp Leu Phe Ala Phe Asn Lys Glu Ile Gly Arg Gly Leu Pro Leu Trp
 275 280 285
 Leu Pro Asn Gly Ala Ile Ile Arg Asp Glu Leu Glu Asp Trp Ala Arg
 290 295 300
 Lys Thr Glu Arg Lys Leu Gly Tyr Lys Arg Val Val Thr Pro His Ile
 305 310 315 320
 Thr Gln Glu Asp Leu Tyr Tyr Leu Ser Gly His Leu Pro Tyr Tyr Ala
 325 330 335
 Glu Asp Leu Tyr Ala Pro Ile Asp Ile Asp Gly Glu Lys Tyr Tyr Leu
 340 345 350
 Lys Pro Met Asn Cys Pro His His His Met Val Tyr Lys Ala Arg Pro
 355 360 365
 His Ser Tyr Arg Asp Leu Pro Tyr Lys Val Ala Glu Tyr Gly Thr Val
 370 375 380
 Tyr Arg Phe Glu Arg Ser Gly Gln Leu His Gly Met Met Arg Thr Arg
 385 390 395 400
 Gly Phe Ser Gln Asn Asp Ala His Ile Tyr Cys Thr Ala Asp Gln Ala
 405 410 415
 Lys Asp Gln Phe Leu Glu Val Met Arg Met His Ala Asp Tyr Tyr Arg
 420 425 430
 Thr Leu Gly Ile Ser Asp Phe Tyr Met Val Leu Ala Leu Arg Asp Ser
 435 440 445
 Ala Asn Lys Asp Lys Tyr His Asp Asp Glu Gln Met Trp Glu Asp Ala
 450 455 460
 Glu Arg Ile Thr Arg Glu Ala Met Glu Glu Ser Asp Ile Pro Phe Gln
 465 470 475 480
 Ile Asp Leu Gly Gly Ala Ala His Tyr Gly Pro Lys Val Asp Phe Met
 485 490 495
 Ile Arg Ala Val Thr Gly Lys Glu Phe Ala Ala Ser Thr Asn Gln Val
 86

500 505 510
 Asp Leu Tyr Thr Pro Gln Arg Phe Gly Leu Thr Tyr His Asp Ser Asp
 515 520 525
 Gly Thr Glu Lys Pro Val Val Val Ile His Arg Ala Pro Leu Gly Ser
 530 535 540
 His Glu Arg Phe Thr Ala Tyr Leu Thr Glu His Phe Ala Gly Ala Phe
 545 550 555 560
 Pro Val Trp Leu Ala Pro Glu Gln Val Arg Ile Ile Pro Ile Val Glu
 565 570 575
 Glu Leu Thr Asp Tyr Ala Glu Glu Val Arg Asp Met Leu Leu Asp Ala
 580 585 590
 Asp Val Arg Ala Asp Val Asp Ala Gly Asp Gly Arg Leu Asn Ala Lys
 595 600 605
 Val Arg Ala Ala Val Thr Arg Lys Ile Pro Leu Val Val Val Val Gly
 610 615 620
 Arg Arg Glu Ala Glu Gln Arg Thr Val Thr Val Arg Asp Arg Ser Gly
 625 630 635 640
 Glu Glu Thr Pro Met Ser Leu Glu Lys Phe Val Ala His Val Thr Gly
 645 650 655
 Leu Ile Arg Thr Lys Ser Leu Asp Gly Ala Gly His Ile Arg Pro Leu
 660 665 670
 Ser Lys Ala
 675

<210> 22
 <211> 103
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 22
 Met Pro Arg Gly Ile Ala Val Asp Val Leu Arg Ala Gly Asp Arg Trp
 1 5 10 15
 Pro His Ser Ala Ala Pro Arg His Arg Gly Leu Leu Asn Ala Trp Trp
 20 25 30
 Gly Ala Trp Val Trp Ala Thr Val Phe Asp Arg Tyr Ala Ser Arg Thr
 35 40 45
 Tyr Asp Asp Ala Gln Asp Val Asp Ala Ile His Asp Ala Ala Gly Leu
 50 55 60
 Val Met Ala Gly Ala Gly Phe Asp Ile Leu Ala Ala Val Leu Ala Ile
 65 70 75 80
 Leu Phe Val Arg Arg Leu Thr Ala Ala Gln His Ala Lys Ala Leu Ala
 85 90 95
 Gly Pro Thr Pro Pro Thr His
 100

<210> 23
 <211> 868
 <212> PRT
 <213> Streptomyces parvulus Tu4055
 <400> 23

Met Glu Ala Phe Leu Leu Leu Ala Ala Glu Ser Val Leu Leu Arg Arg
 1 5 10 15
 Asp Gln Ser Val Tyr Val Thr Pro Gly Ser Glu Pro Asp Gly Pro Pro
 20 25 30
 Arg Ala Ala Leu Arg Arg Leu Glu Ala Glu Leu Leu Gly Arg Gly His
 35 40 45
 Ala Val Ser Ala Pro Leu His Ala Val Leu Ala Ser Leu Asp Ser Glu
 50 55 60
 Glu Leu Ala Ala Ala His Val Arg Leu Val Gly Leu Val Asp Asp Leu
 65 70 75 80
 Leu Gly Ser Asp Arg Thr His Thr Pro Leu Phe Arg Arg Phe Pro Arg
 85 90 95
 Thr Val Pro Arg Asp Thr Glu Ala Leu Tyr Val Asp Arg Val Phe Ala
 100 105 110
 Phe Leu Leu Gln Gln Pro Glu Gln Pro Cys Val Leu Cys Gly Glu Ala
 115 120 125
 Arg Thr Val Leu Pro Val Ser Pro Cys Ala His Leu Val Cys Arg Leu
 130 135 140
 Cys Trp Asp Gly Ser Asp Tyr Ala Gly Cys Pro Leu Cys His Arg Arg
 145 150 155 160
 Ile Asp Gly Asp Asp Pro Phe Leu Arg Pro Val Arg Ala Val Gly Ala
 165 170 175
 Ala Arg Ala Thr Val Pro Gly Pro Leu Arg Leu Leu Arg Leu Gly Thr
 180 185 190
 Asp Met Thr Ala Asp Ala Thr Thr Ala Val Asp Ala Leu Leu Ala Arg
 195 200 205
 Arg Thr Pro Leu Ser Pro Gln Asp Arg Asp Asp Leu Leu Thr Leu Leu
 210 215 220
 Pro Leu Thr Pro Ala Gly Arg Gly Asp Leu Pro Gln Asp Ile Pro Val
 225 230 235 240
 Arg Glu Thr Lys Ala Leu Val Leu Gly Ala Leu Val Arg Arg Ala Pro
 245 250 255
 Ser Arg Pro Ala Leu Arg Arg Leu Leu Ala Glu Arg Leu Thr Thr Ala
 260 265 270
 Thr Asp Val Leu Arg Leu Leu Ala Val Leu Ser Gly Gly Asp Ala Gly
 275 280 285
 Leu Val Thr Pro Ala Arg Phe Thr Asn Val Pro Arg Ser Leu Arg Arg
 290 295 300
 Asp Leu Leu Ala Val Leu Asp Gly Leu Pro Ala Pro Tyr Leu Val Glu
 305 310 315 320
 Asp Met Leu Arg His Pro Thr Ala Trp Lys Arg Ala Ala Glu Val Leu
 325 330 335
 His Pro Phe Glu Gly His Thr Arg His Pro Arg Ala Ala Leu Ala Thr
 340 345 350
 Ala Val Leu Arg Ala Thr Pro Leu Asp Pro Asp Thr Ala Phe Gly Ala
 355 360 365

Ala Leu Leu Thr Thr Ala Ala Ala His Pro Asp Ala Val Arg Pro Asp
 370 375 380
 Gly Thr Arg Val Arg Pro Ala Thr Trp Ala Gly Arg Leu Glu Gln Ala
 385 390 395 400
 Met Ala Glu Gly Asp Ala Ala Arg Ala Ala Ala Leu Ala Gly Glu Arg
 405 410 415
 Pro Gly Glu Leu Val Arg Arg Leu Asp Val Leu Leu Arg Leu His Thr
 420 425 430
 Asp Glu Ala Leu Val Pro Glu Leu Glu Lys Ala Leu Arg His Gly Leu
 435 440 445
 Pro Lys Val Gly Pro Gly Pro Leu Leu Ser Ala Leu Gly Ala Leu Arg
 450 455 460
 Thr Arg Thr Glu Asp Arg Thr Gly Thr Arg Arg Val Phe Phe Pro Arg
 465 470 475 480
 Gly Asp Val Thr Arg Ala Leu Ser Val Pro Glu Arg Arg Pro Ala Leu
 485 490 495
 Pro Ala Gly Pro Val Ser Glu Val Val Ala Leu Leu Glu Gly Glu Leu
 500 505 510
 Leu Arg Arg Phe Ala Ala Gly Arg Pro Tyr Glu Leu Ser Val Leu Asp
 515 520 525
 Ala Gly Leu Thr Asp Leu Thr Val Pro Phe Thr Glu Arg Thr Ala Ala
 530 535 540
 Lys Ala Leu Val Thr Val Gly Arg Gly Ser Val Gln Ala Leu Pro Glu
 545 550 555 560
 Gly Ser Val Leu Arg Leu Phe Leu His Trp Thr Glu Pro Arg Gly Asn
 565 570 575
 Arg Thr Asp Leu Asp Leu Ser Val Ala Phe Phe Asp Ala Glu Trp Thr
 580 585 590
 Phe Thr Gly Leu Cys Asp Tyr Thr Asn Leu Val His Gly Pro Asp Ala
 595 600 605
 Ala Ile His Ser Gly Asp Leu Thr Ser Ala Pro Ala Pro Arg Gly Ala
 610 615 620
 Thr Glu Tyr Val Asp Leu Asp Leu Glu Arg Leu Ala Arg Arg Gly Asp
 625 630 635 640
 Thr Tyr Ala Val Pro Leu Val Phe Ser Tyr Asn Asn Val Pro Phe Glu
 645 650 655
 Glu Leu Pro Asp Ala Phe Ala Gly Phe Met Ala Leu Pro Ala Glu Gly
 660 665 670
 Pro Arg Asp Ala Thr Tyr Asp Pro Arg Thr Val Arg Gln Arg Phe Asp
 675 680 685
 Leu Ala Gly Asp Ser Lys Val Cys Leu Pro Met Ile Val Asp Leu Ala
 690 695 700
 Arg Arg Arg Ala Leu Trp Thr Asp Thr His Leu Pro Ser Ala Gly Gly
 705 710 715 720
 Phe Gln Ser Ile Gly Ser His Gly Gly Gly Glu Leu Ala Ala Val Ala
 89

Pro Ala Thr Thr Phe Gly Thr Val Asn Ala Asp Val Leu Glu His Phe
180 185 190

Ala Pro Gly Phe Arg Arg Thr Asp Phe Val Glu Val Ile Glu Asn Ser
195 200 205

Ala Trp Pro Glu
210

<210> 25
<211> 329
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 25
Met Thr Ala Arg Ala His Ser Val Gly Ile Leu Val Phe Asp Gly Met
1 5 10 15

Lys Met Leu Asp Leu Ser Gly Pro Ala Glu Val Phe Ala Glu Ala Asn
20 25 30

Arg Phe Gly Ala Arg Tyr Arg Leu Gly Val Val Ser Pro Asp Gly Ala
35 40 45

Pro Val Arg Ser Ser Ile Gly Leu Leu Val Pro Ala Glu Ala Asp Ala
50 55 60

Arg Ser Ala Gly Pro Pro Asp Thr Leu Val Val Val Gly Gly Asp Ala
65 70 75 80

Leu Pro Gly Ser Pro Val Asp Pro Arg Leu Ile Asp Ala Ala Lys Ala
85 90 95

Leu Ala Ala Arg Ala Gly Arg Val Ala Ser Val Cys Thr Gly Ala Phe
100 105 110

Val Leu Gly Ala Ala Gly Leu Leu Glu Gly Arg Arg Ala Thr Thr His
115 120 125

Trp Gln His Thr Thr Ala Leu Ala Arg Arg Cys Pro Ser Thr Arg Val
130 135 140

Glu Pro Asp Ala Ile Phe Val Lys Asp Gly Ala Thr Tyr Thr Ser Ala
145 150 155 160

Gly Val Thr Ala Gly Ile Asp Leu Ala Leu Ala Leu Leu Glu Glu Asp
165 170 175

His Gly Pro Asp Leu Ala Arg Arg Val Ala Arg Ser Leu Val Val Tyr
180 185 190

Leu Gln Arg Ala Gly Gly Gln Ser Gln Phe Ser Ala Ser Leu Arg Gly
195 200 205

Pro Ala Pro Arg Thr Pro Val Leu Arg Gln Val Gln Asp Ala Val Gln
210 215 220

Ala Asp Pro Ala Ala Asp His Ser Leu Ala Ala Leu Ala Ala Arg Val
225 230 235 240

Arg Val Ser Pro Arg His Leu Thr Arg Met Phe Arg Ala Glu Leu Asp
245 250 255

Val Thr Pro Val Lys Tyr Val Glu Leu Ile Arg Phe Asp Ile Ala Lys
260 265 270

Ala Leu Leu Asp Ser Gly His Asn Ala Thr Glu Ala Ala Ala Leu Ser
275 280 285

Gly Phe Pro Ser Tyr Glu Ser Leu Arg Arg Ala Phe Ala Arg His Leu
 290 295 300

Gly Leu Ser Pro Thr Arg Tyr Arg Gln Arg Phe Ala Thr Thr Val Pro
 305 310 315 320

Asp Ala Gly Pro Arg Pro Asp Gly Gly
 325

<210> 26
 <211> 276
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 26
 Met Gly Thr Val Thr Thr Ser Asp Gly Thr Ser Ile Phe Tyr Lys Asp
 1 5 10 15

Trp Gly Pro Arg Asp Ala Pro Pro Ile Val Phe His His Gly Trp Pro
 20 25 30

Leu Thr Ala Asp Asp Trp Asp Asn Gln Met Leu Phe Phe Leu Ser His
 35 40 45

Gly Tyr Arg Val Ile Ala His Asp Arg Arg Gly His Gly Arg Ser Gly
 50 55 60

Gln Pro Ser Thr Gly His Glu Met Asp Thr Tyr Ala Ala Asp Val Ala
 65 70 75 80

Ala Leu Thr Glu Ala Leu Asp Leu Arg Asp Ala Val His Ile Gly His
 85 90 95

Ser Thr Gly Gly Gly Glu Val Ala Arg Tyr Val Ala Arg Ala Glu Pro
 100 105 110

Gly Arg Val Ala Lys Ala Val Leu Val Gly Ala Val Pro Pro Val Met
 115 120 125

Val Lys Ser Asp Ala Asn Pro Gly Gly Thr Pro Ile Glu Val Phe Asp
 130 135 140

Gly Phe Arg Thr Ala Leu Ala Ala Asn Arg Ala Gln Phe Tyr Ile Asp
 145 150 155 160

Val Pro Ser Gly Pro Phe Tyr Gly Phe Asn Arg Glu Gly Ala Lys Val
 165 170 175

Ser Gln Gly Leu Ile Asp Asn Trp Trp Arg Gln Gly Met Ser Gly Ala
 180 185 190

Ala Asn Ala His Tyr Glu Cys Ile Lys Ala Phe Ser Glu Thr Asp Phe
 195 200 205

Thr Glu Asp Leu Lys Ala Ile Asp Val Pro Val Leu Val Ala His Gly
 210 215 220

Thr Asp Asp Gln Val Val Pro Tyr Ala Asp Ser Ala Pro Leu Ser Val
 225 230 235 240

Lys Leu Leu Lys Asn Gly Thr Leu Lys Ser Tyr Glu Gly Leu Pro His
 245 250 255

Gly Met Leu Ser Thr His Pro Glu Val Val Asn Pro Asp Leu Leu Asp
 260 265 270

Phe Val Arg Ser

275

<210> 27
<211> 185
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 27
Met Gly Val Met Ile Gly Pro Ala Gly Arg Glu Arg Asp Glu Gly Asp
1 5 10 15
His Val Thr Gln Gln Ala Pro Val Ala Thr Asp Glu Arg Arg Val Phe
20 25 30
Val Asp Lys Gln Thr Pro Gly Ala Tyr Lys Ala Phe Val Ala Ala Ala
35 40 45
Glu Ser Val Arg Glu Ala Ala Ala Ala Gly Leu Asp Arg Leu Leu
50 55 60
Val Glu Leu Val Asn Ile Arg Val Ser Gln Leu Asn Ala Cys Ala Tyr
65 70 75 80
Cys Leu Ser Leu His Thr Arg Ala Ala Leu Arg Ala Gly Glu Thr Thr
85 90 95
Gln Arg Leu Ala Val Leu Pro Ala Trp Arg Asp Thr Glu Leu Phe Thr
100 105 110
Ala Arg Glu Arg Ala Ala Leu Ala Leu Ala Glu Ala Thr Thr Arg Pro
115 120 125
Ala Asp Ala Ala Ala Gln Ser Ala Ala Tyr Ala Gln Ala Arg Gly Val
130 135 140
Leu Ser Asp Asp Glu Val Ser Ala Val Ile Trp Val Ala Ile Ser Ile
145 150 155 160
Asn Ala Phe Asn Arg Val Ser Val Leu Ser Lys His Pro Val Arg Gly
165 170 175
Ala Ala Pro Ala Pro Val Ser Pro Ala
180 185

<210> 28
<211> 324
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 28
Met Val Ser Asn Thr Glu Thr Arg Pro Ala Glu Met Arg Cys Gly Ala
1 5 10 15
Leu Glu Asp Glu Val Pro Ala Ala Gly Val Glu Val Leu Thr Ala Arg
20 25 30
Asp Val Pro Leu Gly Gly Pro Arg Ala Met Thr Val Arg Arg Thr Leu
35 40 45
Pro Gln Arg Ala Arg Thr Leu Ile Gly Ala Trp Cys Phe Ala Asp His
50 55 60
Tyr Gly Pro Asp Asp Val Ala Ala Ser Gly Gly Met Asp Val Ala Pro
65 70 75 80
His Pro His Ile Gly Leu Gln Thr Val Ser Trp Leu Phe Ser Gly Glu
85 90 95

Ile Glu His Arg Asp Ser Leu Gly Thr His Ala Phe Val Arg Pro Gly
 100 105 110
 Glu Leu Asn Leu Met Thr Gly Gly Phe Gly Ile Ala His Ser Glu Val
 115 120 125
 Ser Thr Pro Asp Thr Thr Val Leu His Gly Val Gln Leu Trp Val Ala
 130 135 140
 Leu Pro Glu Glu His Arg Asp Thr Gly Arg Asp Phe Gln His His Ala
 145 150 155 160
 Pro Ala Pro Val Ala Phe Asp Gly Gly Thr Ala Arg Val Phe Leu Gly
 165 170 175
 Ser Leu Ala Gly Asp Thr Ser Pro Val Ser Thr Phe Thr Pro Leu Leu
 180 185 190
 Gly Ala Glu Leu Thr Leu Val Pro Gly Gly Thr Ala Thr Leu Asp Val
 195 200 205
 Asp Pro Gly Phe Glu His Gly Val Leu Val Asp Ser Gly Asp Val Arg
 210 215 220
 Val Glu Gly Ala Val Val Arg Pro Ala Glu Leu Gly Tyr Val Ala Pro
 225 230 235 240
 Gly Arg Ala Thr Leu Thr Leu Thr Asn Glu Ser Ala Ala Pro Ala Arg
 245 250 255
 Leu Ile Leu Leu Gly Gly Pro Pro Phe Pro Glu Glu Ile Ile Met Trp
 260 265 270
 Trp Asn Phe Ile Gly Arg Ser His Asp Glu Ile Val Arg Ala Arg Glu
 275 280 285
 Asp Trp Met Lys Gly Asp Arg Phe Gly Glu Val His Gly Tyr Asp Gly
 290 295 300
 Ala Pro Leu Pro Ala Pro Glu Leu Pro Asn Ala Pro Leu Lys Pro Arg
 305 310 315 320
 Arg Arg Ala Arg

<210> 29
 <211> 126
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 29
 Met Val Pro Thr Met Leu Cys Met Val Ala Val Pro Glu Ser His Ser
 1 5 10 15
 Gly Trp Thr Phe Val Thr Asn His Ala Arg Val Leu Ala Ala Ile Ala
 20 25 30
 Asp Asn Pro Asn Val Arg Ile Arg Asp Ile Ala Ala His Cys Arg Leu
 35 40 45
 Thr Glu Arg Ala Val Gln Arg Ile Ile Ser Asp Leu Glu Gln Asp Gly
 50 55 60
 Tyr Leu Ser His Thr Arg Asp Gly Arg Ser Asn Ile Tyr Arg Val Glu
 65 70 75 80
 Pro Asp Lys Val Leu Arg His Pro Ala Glu Ala Gly Leu Thr Val Ala
 85 90 95
 94

Ala Leu Leu Ser Leu Leu Val Arg Asp Glu Thr Asp His Gly Arg Ser
100 105 110

Ala Gly Pro Gly Ser Arg Pro Ala Arg Ser Ser Ala Ala Arg
115 120 125

<210> 30
<211> 127
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 30
Met Ser Leu Asp Glu Ala Val Ala Gly Cys Ser Arg His Thr Gly Arg
1 5 10 15

Arg Arg Leu Pro Ala Ala Glu Gln Pro Thr Gln Ala Gln Tyr Glu Ala
20 25 30

His Gly Ala Trp Val Val Ser Ala Arg Gly Ala Tyr Asp Met Asn Ser
35 40 45

Val Glu Pro Leu Ala Asp Ala Leu Lys Asp Ala Ala Glu Lys Ser Pro
50 55 60

Lys Val Val Leu Asp Ala Ser Gly Ile Thr Phe Ala Asp Ser Thr Leu
65 70 75 80

Leu Ser Leu Leu Ile Leu Thr His Gln Ala Thr Asp Phe Arg Val Ala
85 90 95

Ala Pro Thr Trp Gln Val Met Arg Leu Met Gln Leu Thr Gly Val Asp
100 105 110

Ala Phe Leu Lys Val Arg Ala Thr Val Glu Glu Ala Ala Thr Ala
115 120 125

<210> 31
<211> 82
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 31
Met Ser Met Ile Leu Pro Ala Glu Lys Glu Leu Arg Ala Val Leu Ala
1 5 10 15

Arg Phe Ala Gln Ala Arg Ile Asp His Asp Val Arg Pro Ser Gly Cys
20 25 30

Thr Ser Arg Leu Leu Glu Asp Ala Thr Tyr Thr Leu Cys Val Met Thr
35 40 45

Gly Ala Arg Thr Ala Glu Gln Ala Leu Arg Thr Ala Asp Glu Leu Leu
50 55 60

Ala Gln Phe Ala Glu Arg Thr Ala Ala Pro Val Glu Asp Glu Ala Leu
65 70 75 80

Ala Ala

<210> 32
<211> 70
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 32
Met Ser Asp Thr Arg Leu Arg Gln Arg Asp Glu Thr Ser Lys Gly Pro
1 5 10 15
95

Ala Thr Glu Ile Pro Ala Pro Gln Trp Arg Asp Leu Phe Leu Ala Pro
20 25 30
Asp Trp Gly Gly Thr Asp Glu Gln Val Ile Val Ala Glu Glu Ala Arg
35 40 45
Gly Pro Glu His Phe Thr Gly Ala Arg Arg Pro Arg Gly Gly Arg Arg
50 55 60
Ser Ser Arg Arg Ala Ala
65 70

<210> 33
<211> 172
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 33
Met Arg Cys Ser His Arg Ala Gly Gly Val Gly Ala Arg Ala Trp Leu
1 5 10 15
Gly Gly Asn Val Ala Val Asp Met Gly Glu Thr Gly Leu Asp Gly Ser
20 25 30
Ser Thr Gln Arg Ala Pro Glu Gly Ala Asp Pro Arg Ala Ala Ser Val
35 40 45
Thr Tyr Arg Arg Glu Ala Leu Arg Ile Ala Asp Ala Arg His Phe Ala
50 55 60
Thr Asp Tyr Leu Thr Arg Ser Gln Arg Asp Leu Arg Ser Pro Val Pro
65 70 75 80
Glu Arg Ala Ser Glu Ala Val His Leu Val Val Ser Glu Leu Ile Thr
85 90 95
Asn Ala Val Lys Tyr Gly Ala Asp Pro Ile Glu Leu Thr Leu Ser Leu
100 105 110
Thr Asp Asp Ala Val Thr Val Thr Val Arg Asp Gly Asp Thr Thr Leu
115 120 125
Pro Ala Pro Arg Pro Ala Asp Pro Ala Arg Val Gly Gln His Gly Leu
130 135 140
Glu Ile Val Ala Ala Leu Ser Gln Ala Val Glu Ile Arg Pro Glu Pro
145 150 155 160
Ser Gly Lys Arg Ile Thr Ala Arg Ile Ala Leu Thr
165 170

<210> 34
<211> 105
<212> PRT
<213> Streptomyces parvulus Tu4055

<400> 34
Met Gln Ser Ser Ser Ala Ser Val Arg Gly Glu Ile Val Ile Arg Arg
1 5 10 15
Ala Val Ala Arg Asp Ala Lys Arg Leu Ser Arg Leu Val Arg Gly Ser
20 25 30
Arg Ala Tyr Glu Gly Pro Tyr Ala Ala Met Val Ser Asp Tyr Arg Val
35 40 45
Gly Pro Asp Tyr Ile Glu Asn His Gln Val Phe Val Ala Ser Thr Pro
96

50 55 60
 Arg Thr Pro Arg Thr Gly Cys Ser Ala Ser Thr Arg Cys Ser Ser Arg
 65 70 75 80
 Arg Arg Ser Trp Thr Cys Cys Ser Ser Arg Thr Val Pro Arg Ala Ala
 85 90 95
 Ala Ser Asp Gly Cys Leu Ser Ile Thr
 100 105

<210> 35
 <211> 638
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 35
 Met Ala Gln Arg Arg Thr Pro Phe Gly Asp Arg Ala Arg Tyr Trp Phe
 1 5 10 15
 Asp Ser Thr Leu Ala Arg Gly Ala Ala Ala Leu Val Gly Trp Met Ala
 20 25 30
 Leu Leu Ser Leu Ala Val Val Val Pro Ala Ser Ala Val Met Val Trp
 35 40 45
 Thr Asp Pro Asp Ala Pro Pro Ser Leu Ala Glu Arg Leu Ala Glu Val
 50 55 60
 Trp Arg Leu Thr Gly Glu Thr Leu Arg Leu Gly Gly Ala Thr Gly Thr
 65 70 75 80
 Pro Leu Arg Ala Met Leu Ser Val Leu Leu Ala Leu Val Thr Leu Leu
 85 90 95
 Tyr Val Ser Thr Leu Val Gly Leu Ile Thr Thr Ala Leu Thr Glu Arg
 100 105 110
 Leu Thr Ser Leu Arg Arg Gly Arg Ser Thr Val Leu Glu Gln Gly His
 115 120 125
 Ala Val Val Leu Gly Trp Ser Glu Gln Val Phe Thr Val Val Ser Glu
 130 135 140
 Leu Val Ala Ala Asn Val Asn Gln Arg Gly Ala Ala Val Val Val Leu
 145 150 155 160
 Ala Asp Arg Asp Lys Thr Val Met Glu Glu Ser Leu Gly Thr Lys Val
 165 170 175
 Gly Ser Cys Gly Gly Thr Arg Leu Ile Cys Arg Ser Gly Pro Thr Thr
 180 185 190
 Asp Pro Ala Val Leu Pro Leu Thr Ser Pro Ala Thr Ala Gly Val Val
 195 200 205
 Leu Val Leu Pro Pro Asp Glu Pro His Ala Asp Ala Glu Val Val Lys
 210 215 220
 Thr Leu Leu Ala Leu Arg Ala Ala Leu Ala Gly Ala Lys Pro Arg Pro
 225 230 235 240
 Pro Val Val Ala Ala Val Arg Asp Asp Arg Tyr Arg Leu Ala Ala Cys
 245 250 255
 Leu Ala Ala Gly Pro Asp Gly Val Val Leu Glu Ser Asp Thr Val Thr
 260 265 270

Ala Arg Leu Ile Val Gln Ala Ala Arg Arg Pro Gly Ile Ser Leu Val
 275 280 285
 His Arg Glu Leu Leu Asp Phe Ala Gly Asp Glu Phe Tyr Leu Ile Ser
 290 295 300
 Glu Pro Ala Leu Thr Gly Arg Pro Phe Gly Glu Val Leu Leu Ser Tyr
 305 310 315 320
 Ser Thr Thr Ser Val Val Gly Leu Met Arg Gly Cys Thr Pro Leu Leu
 325 330 335
 Asn Pro Pro Pro Thr Thr Pro Val Ala Pro Asp Asp Leu Leu Val Val
 340 345 350
 Ile Thr Gly Asp Asp Asp Thr Ala Arg Leu Asp Asp Cys Ala Glu Ser
 355 360 365
 Val Glu Lys Ala Ala Val Ala Ser Arg Pro Pro Thr Pro Ala Pro Ala
 370 375 380
 Glu Arg Ile Leu Leu Leu Gly Trp Asn Arg Arg Ala Pro Leu Val Val
 385 390 395 400
 Asp Gln Leu His Arg Arg Ala Arg Pro Gly Ser Ala Val Asp Val Val
 405 410 415
 Ala Glu Pro Gly Glu Ala Thr Ile Arg Glu Ile Ser Glu Ala Glu Ala
 420 425 430
 Asp Ser Gly Asn Gly Glu Asn Gly Gly Asn Gly Leu Ser Leu Ala Leu
 435 440 445
 His His Gly Asp Ile Thr Arg Pro Glu Thr Leu Arg Arg Leu Asp Val
 450 455 460
 His Ser Tyr Asp Ser Val Ile Val Leu Gly Arg Asp Pro Ala Pro Gly
 465 470 475 480
 Gln Pro Pro Asp Asp Pro Asp Asn Arg Thr Leu Val Thr Leu Leu Leu
 485 490 495
 Leu Arg Gln Leu Glu Glu Ala Thr Gly Arg Glu Leu Pro Val Val Thr
 500 505 510
 Glu Leu Ile Asp Asp Arg Asn Arg Ala Leu Ala Pro Ile Gly Pro Gly
 515 520 525
 Ala Asp Val Ile Ile Ser Gly Lys Leu Ile Gly Leu Leu Met Ser Gln
 530 535 540
 Ile Ser Gln Asn Arg His Leu Ala Ala Val Phe Glu Glu Leu Phe Ser
 545 550 555 560
 Ala Glu Gly Ala Gly Val Arg Leu Arg Pro Ala Thr Asp Tyr Leu Leu
 565 570 575
 Pro Gly Ser Thr Thr Ser Phe Ala Thr Val Val Ala Ala Ala Arg Arg
 580 585 590
 Arg Gly Glu Cys Ala Ile Gly Tyr Arg Asp His Ala Asp Ala Ser Thr
 595 600 605
 Arg Pro His Tyr Gly Val Arg Ile Asn Pro Pro Lys Arg Glu Arg Arg
 610 615 620
 Arg Trp Thr Ala Glu Asp Glu Val Val Val Ile Gly Thr Asp
 98

625

630

635

<210> 36
 <211> 165
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 36
 Met Pro Ser Thr Asp Val Val Glu Leu Ile Leu Arg Asp His Arg Arg
 1 5 10 15
 Met Glu Glu Leu Phe Arg Thr Leu Arg Asn Val Glu Ala Asp Arg Ala
 20 25 30
 Ala Ala Leu Thr Glu Phe Ala Asp Leu Leu Ile Ala His Ala Ser Ala
 35 40 45
 Glu Glu Asp Glu Val Tyr Pro Ala Leu Arg Arg Tyr Lys Asn Val Glu
 50 55 60
 Gly Glu Asp Val Asp His Ser Val His Glu His His Glu Ala Asn Glu
 65 70 75 80
 Ala Leu Leu Ala Leu Leu Glu Val Glu Asp Thr Ala Ser Asp Glu Trp
 85 90 95
 Asp Asp Lys Leu Glu Glu Leu Val Thr Ala Val Asn His His Ala Asp
 100 105 110
 Glu Glu Glu Arg Thr Leu Leu Asn Asp Ala Arg Glu Asn Val Ala Asp
 115 120 125
 Asp Arg Arg Arg Glu Leu Gly Gln Lys Phe Gln Glu Ala Arg Ser Arg
 130 135 140
 Tyr Leu Glu Thr Gly Cys Gly Ser Val Glu Asn Val Arg Lys Leu Val
 145 150 155 160
 Ala Ala Ala Asp Asp
 165

<210> 37
 <211> 787
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 37
 Met Ala Arg Arg Leu Thr Glu Gly Arg Thr Arg Arg Glu Lys Gly Glu
 1 5 10 15
 His Met Gln Lys Pro His Gly Glu Glu Ser Glu Thr Ser Leu Ser Val
 20 25 30
 Thr Pro Pro Lys Lys Trp Ala Ala Gly Val Pro Ala Val Val His Ala
 35 40 45
 Leu Glu Tyr Ser Leu Glu Gln Thr Ser Pro Arg Arg Thr Gly Val Asp
 50 55 60
 Leu Leu Thr Met Asn Gln Val Gly Gly Ile Asp Cys Pro Gly Cys Ala
 65 70 75 80
 Trp Ala Asp Pro Ala Pro Gly Arg Arg His Arg Asn Glu Tyr Cys Glu
 85 90 95
 Asn Gly Ala Lys His Ile Asn Asp Glu Ala Thr Thr Arg Arg Val Thr
 100 105 110

Ala Asp Phe Phe Arg Glu His Ser Val Ala Asp Leu Ala Gly Arg Ser
 115 120 125
 Asp Met Trp Leu Asn Gln Gln Gly Arg Leu Thr Glu Pro Met Ile Lys
 130 135 140
 Arg Pro Gly Ser Ala His Tyr Glu Pro Ile Gly Trp Asn Asp Ala Leu
 145 150 155 160
 Gly Val Leu Ala Glu Glu Leu Lys Ser Leu Ala Ser Pro Asp Glu Ala
 165 170 175
 Val Phe Tyr Thr Ser Gly Arg Ala Ser Asn Glu Ala Ala Phe Val Leu
 180 185 190
 Gln Leu Phe Ala Arg Ala Phe Gly Thr Asn Asn Leu Pro Asp Cys Ser
 195 200 205
 Asn Met Cys His Glu Ser Ser Gly Phe Ala Leu Ser Glu Thr Leu Gly
 210 215 220
 Thr Gly Lys Gly Thr Val Gly Leu Asp Asp Leu His His Ala Asp Leu
 225 230 235 240
 Ile Phe Leu Val Gly Gln Asn Pro Gly Ser Asn His Pro Arg Gln Leu
 245 250 255
 Ser Ala Leu Glu Glu Ala Lys Arg Asn Gly Ala Arg Ile Val Ala Val
 260 265 270
 Asn Pro Leu Pro Glu Ala Gly Leu Arg Arg Phe Lys Asn Pro Gln Gln
 275 280 285
 Pro Arg Gly Val Val Gly Arg Gly Thr Arg Ile Ala Asp Arg Phe Leu
 290 295 300
 His Ile Lys Pro Gly Gly Asp Leu Ala Leu Phe Gln Ala Leu Asn Arg
 305 310 315 320
 Leu Leu Leu Glu Ala Glu Asp Ala Arg Pro Gly Thr Val Leu Asp His
 325 330 335
 Asp Phe Ile Asp Ala His Thr Thr Gly Phe Glu Glu Phe Ala Arg His
 340 345 350
 Ala Arg Thr Val Asp Trp Asp Asp Val Arg Ala Ala Thr Gly Leu Thr
 355 360 365
 Arg Glu Glu Ile Glu Lys Val Arg Asp Glu Val Leu Asp Ser Glu Arg
 370 375 380
 Val Val Val Cys Trp Ala Met Gly Ile Thr Gln His Lys His Gly Val
 385 390 395 400
 Pro Thr Val Arg Glu Ile Val Asn Phe Leu Met Leu Arg Gly Asn Leu
 405 410 415
 Gly Arg Ala Gly Thr Gly Ala Cys Pro Val Arg Gly His Ser Asn Val
 420 425 430
 Gln Gly Asp Arg Thr Met Gly Ile Trp Glu Gln Met Pro Asp Thr Phe
 435 440 445
 Leu Asp Ala Leu Arg Asp Glu Phe Gly Phe Glu Pro Pro Arg Ala His
 450 455 460
 Gly Leu Asp Ser Val Asn Ser Ile Lys Ala Met Arg Glu Gly Arg Val
 465 470 475 480

Lys Val Phe Leu Ala Leu Ala Gly Asn Phe Val Arg Ala Ala Pro Asp
 485 490 495
 Ser Glu Val Thr Glu Glu Ala Met Arg Ser Cys Arg Leu Thr Ala His
 500 505 510
 Ile Ser Thr Lys Leu Asn Arg Ser His Thr Val Cys Gly Asp Thr Ala
 515 520 525
 Leu Ile Leu Pro Thr Leu Gly Arg Thr Glu Arg Asp Val Gln Ala Asp
 530 535 540
 Gly Glu Gln Phe Val Thr Val Glu Asn Ser Met Ser Glu Val His Thr
 545 550 555 560
 Ser Arg Gly Arg Leu Ala Pro Ala Ser Pro Met Leu Leu Ser Glu Ile
 565 570 575
 Ala Ile Leu Cys Arg Leu Ala Arg Leu Thr Leu Asp Gly Arg Val Glu
 580 585 590
 Ile Pro Trp Glu Thr Phe Glu Gly Asp Tyr His Thr Ile Arg Asp Arg
 595 600 605
 Ile Ala Arg Ile Val Pro Gly Phe His Asp Phe Asn Ala Arg Val Thr
 610 615 620
 Arg Pro Gly Gly Phe Gln Leu Pro Asn Pro Val Asn Glu Gly Val Phe
 625 630 635 640
 Asn Thr Glu Val Gly Lys Ala Leu Phe Thr Arg Asn Glu Ser Val Val
 645 650 655
 Pro Arg Ala Pro Glu Gly His Leu Leu Leu Gln Thr Leu Arg Ser His
 660 665 670
 Asp Gln Trp Asn Thr Val Pro Tyr Thr Asp Asn Asp Arg Tyr Arg Gly
 675 680 685
 Ile His Gly Ser Arg His Val Val Leu Val Asn Pro Ala Asp Leu Ser
 690 695 700
 Glu Leu Gly Leu Ala Gln Gly Asp Arg Val Asp Leu Val Ser Val Trp
 705 710 715 720
 Ala Asp Gly Thr Glu Arg Arg Ala Glu Asn Phe Gln Val Val Pro Tyr
 725 730 735
 Pro Ala Ala Lys Gly Ser Ala Ala Ala Tyr Tyr Pro Glu Thr Asn Val
 740 745 750
 Leu Val Pro Leu Asp Ser Val Ala Asp Ile Ser Asn Gln Pro Thr Ser
 755 760 765
 Lys Gly Ile Val Val Arg Leu Glu Pro Val Pro Asp Arg Thr Gln Pro
 770 775 780
 Ser Pro Ala
 785

<210> 38
 <211> 206
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 38
 Met Ala Glu Gln His Glu Gly Pro Arg Ala Val Pro Asp Thr Pro Gly
 101

1		5		10		15
Ala	Arg	Thr	Ser ₂₀	Gly	Asp	Arg
				Ser	Thr ₂₅	Gly
				Arg	Arg	Pro
				Leu ₃₀	Arg	Glu
Arg	His	Val ₃₅	Asp	Gln	Thr	Val
				Glu ₄₀	Val	Ala
				Val	Pro	Val ₄₅
				Arg	Phe	Ser
Tyr	Asn ₅₀	Gln	Trp	Thr	Gln	Phe ₅₅
				Lys	Ser	Phe
				Pro	Arg ₆₀	Phe
				Ser	Ala	Val
Val ₆₅	Arg	Asp	Val	Glu	Gln ₇₀	Val
				Arg	Pro	Thr
				Val ₇₅	Thr	Ala
				Trp	Thr	Leu ₈₀
Gly	Tyr	Gly	Pro	Leu ₈₅	Arg	Arg
				Arg	Phe	Ala
				Val ₉₀	Glu	Ile
				Leu	Glu ₉₅	Gln
Asp	Pro	Asp	Ala ₁₀₀	Tyr	Leu	Ala
				Trp	Arg ₁₀₅	Gly
				Leu	Glu	Gln
				Arg	Pro	Trp
His	Arg	Gly ₁₁₅	Glu	Val	Glu	Phe
				Arg ₁₂₀	Pro	Thr
				Glu	Ser	Gly ₁₂₅
				Gly	Gly	Thr
				Ala	Ala	Arg
Ile	Thr ₁₃₀	Val	Arg	Val	Leu	Leu ₁₃₅
				Glu	Pro	Arg
				Gly	Ala ₁₄₀	Ala
				Arg	Ile	Leu
Thr	Arg	Ser	Ser	Arg	Ala ₁₅₀	Val
₁₄₅				Arg	Leu	Thr
				Thr ₁₅₅	Arg	Leu
				Val	His	Gly ₁₆₀
Glu	Leu	Thr	Arg	Phe ₁₆₅	Lys	Arg
				Phe	Met	Glu
				Glu ₁₇₀	Gly	Leu
				Gly	Gln	Glu ₁₇₅
Gly	Ala	Trp	Arg	Gly	Thr	Ile
				Arg	Asn ₁₈₅	Gly
				Arg	Val	Gln
				His ₁₉₀	Asp	Arg
Pro	Glu	Pro	Pro	Arg	Ser	Arg
				Val ₂₀₀	Ala	Arg
				Trp	Pro	Val
				Gly ₂₀₅		

<210> 39
 <211> 251
 <212> PRT
 <213> Streptomyces parvulus Tu4055

Met ₁	Leu	Leu	Leu	Ile ₅	Ser	Pro	Asp	Gly	Val ₁₀	Glu	Glu	Ala	Leu	Asp
														Cys ₁₅
Ala	Lys	Ala	Ala ₂₀	Glu	His	Leu	Asp	Ile ₂₅	Val	Asp	Val	Lys	Lys ₃₀	Pro
														Asp
Glu	Gly	Ser ₃₅	Leu	Gly	Ala	Asn	Phe ₄₀	Pro	Trp	Val	Ile	Arg ₄₅	Glu	Ile
														Arg
Asp	Ala	Val	Pro	Ala	Asp	Lys ₅₅	Pro	Val	Ser	Ala	Thr ₆₀	Val	Gly	Asp
₅₀														Val
Pro	Tyr	Lys	Pro	Gly	Thr	Val	Ala	Gln	Ala	Ala ₇₅	Leu	Gly	Ala	Val
₆₅														Val ₈₀
Ser	Gly	Ala	Thr	Tyr ₈₅	Ile	Lys	Val	Gly	Leu ₉₀	Tyr	Gly	Cys	Thr	Thr
														Pro ₉₅
Glu	Gln	Gly	Ile ₁₀₀	Ala	Val	Met	Arg	Ala ₁₀₅	Val	Val	Arg	Ala	Val ₁₁₀	Lys
														Asp
His	Arg	Pro	Glu	Ala	Leu	Val	Val ₁₂₀	Ala	Ser	Gly	Tyr	Ala ₁₂₅	Asp	Ala
₁₁₅														His

Arg Ile Gly Cys Val Asn Pro Leu Ala Leu Pro Asp Ile Ala Ala Arg
 130 135 140
 Ser Gly Ala Asp Ala Ala Met Leu Asp Thr Ala Val Lys Asp Gly Thr
 145 150 155 160
 Arg Leu Phe Asp His Val Pro Pro Asp Thr Cys Ala Glu Phe Val Arg
 165 170 175
 Arg Ala His Ala Ala Gly Leu Leu Ala Ala Leu Ala Gly Ser Val Arg
 180 185 190
 Gln Thr Asp Leu Gly Arg Leu Thr Arg Ile Gly Thr Asp Ile Val Gly
 195 200 205
 Val Arg Gly Ala Val Cys Glu Gly Gly Asp Arg Asn Ala Gly Arg Ile
 210 215 220
 Arg Pro His Leu Val Ala Ala Phe Arg Ser Glu Met Asp Arg His Ala
 225 230 235 240
 Arg Glu His Arg Ala Gly Val Thr Thr Ala Ser
 245 250

<210> 40
 <211> 467
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 40
 Met Pro Thr Pro Ala Pro Asp His Ala Pro Ala Gln Arg Ala Ala Pro
 1 5 10 15
 Leu Ala Val Val Asp Pro Ala Thr Gly Thr Val Phe Asp Glu Ala Pro
 20 25 30
 Asp Gln Gly Pro Asp Val Leu Asp Ala Val Val Asp Arg Ala Arg Arg
 35 40 45
 Ala Trp His Gly Trp Arg Ala Asp Pro Asp Ala Arg Thr Thr Ala Leu
 50 55 60
 Arg Ser Ala Ala Asp Ala Val Glu Ala Ala Gly Asp Asp Leu Ala Arg
 65 70 75 80
 Leu Leu Thr Arg Glu Gln Gly Lys Pro Leu Ala Glu Ser His Ala Glu
 85 90 95
 Val Ala Arg Thr Ala Ala Arg Leu Arg Tyr Phe Ala Gly Leu Ala Pro
 100 105 110
 Arg Thr Arg Arg Ile Thr Asp Gly Arg Pro Val Arg Ser Glu Val Arg
 115 120 125
 Trp Arg Pro Leu Gly Pro Val Ala Ala Ile Val Pro Trp Asn Phe Pro
 130 135 140
 Leu Gln Leu Ala Ser Ala Lys Phe Ala Pro Ala Leu Ala Ala Gly Asn
 145 150 155 160
 Thr Met Val Leu Lys Pro Ser Pro Phe Thr Pro Leu Ala Thr Arg Leu
 165 170 175
 Leu Gly Ser Val Leu Ala Thr Ala Leu Pro Glu Asp Val Leu Thr Val
 180 185 190
 Val Thr Gly Arg Glu Pro Leu Gly Ala Arg Leu Ala Ala His Pro Gly
 195 200 205

Ile Arg His Val Thr Phe Thr Gly Ser Val Pro Thr Gly Arg Ala Val
 210 215 220
 Ala Arg Ala Ala Ala Ala Ser Leu Ala Arg Val Thr Leu Glu Leu Gly
 225 230 235 240
 Gly Asn Asp Ala Ala Val Leu Leu Asp Asp Val Glu Val Asp Arg Ile
 245 250 255
 Ala Asp Arg Leu Phe Trp Ala Ala Phe Arg Asn Cys Gly Gln Val Cys
 260 265 270
 Met Ala Val Lys Arg Val Tyr Ala Pro Ala Arg Leu His Ala Gln Val
 275 280 285
 Val Glu Ala Leu Thr Glu Arg Ala Lys Ala Val Ala Val Gly Pro Gly
 290 295 300
 Leu Asp Pro Arg Thr Arg Leu Gly Pro Val Ala Asn Ala Pro Gln Leu
 305 310 315 320
 Ala Arg Val Glu Gln Ile Thr Arg Arg Ala Leu Ala Asp Gly Ala Arg
 325 330 335
 Ala Ala Ala Gly Gly His Arg Leu Asp Gly Pro Gly Cys Phe Phe Ala
 340 345 350
 Pro Thr Ile Leu Thr Asp Val Pro Pro Asp Ser Pro Val Val Thr Glu
 355 360 365
 Glu Gln Phe Gly Pro Val Leu Pro Val Leu Pro Tyr Arg Ser Leu Asp
 370 375 380
 Glu Ala Val Asp Ala Ala Asn Gly Thr Gly Phe Gly Leu Gly Gly Ser
 385 390 395 400
 Val Trp Gly Thr Asp Leu Asp Arg Ala Glu Ala Val Ala Asp Arg Leu
 405 410 415
 Glu Cys Gly Thr Ala Trp Val Asn His His Ala Glu Leu Ser Leu Ala
 420 425 430
 Gln Pro Phe Ala Gly Asp Lys Asp Ser Gly Val Gly Val Ala Gly Gly
 435 440 445
 Pro Trp Gly Leu Tyr Gly Asn Leu Arg Pro Phe Val Val His Arg Pro
 450 455 460
 Arg Gly Glu
 465

<210> 41
 <211> 368
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 41
 Met Ser Phe Arg Ala Ala Val Leu Arg Gly Tyr Glu Asp Pro Phe Thr
 1 5 10 15
 Val Glu Glu Val Thr Leu Gly Thr Glu Pro Gly Ala Gly Glu Ile Leu
 20 25 30
 Val Glu Ile Ala Gly Cys Gly Met Cys Arg Thr Asp Leu Ala Val Arg
 35 40 45
 Arg Ser Ala Gly Arg Ser Pro Leu Pro Ala Val Leu Gly His Glu Gly
 104

50					55					60					
Ser 65	Gly	Val	Val	Val	Arg 70	Thr	Gly	Gly	Gly	Pro 75	Asp	Thr	Ala	Ile	Gly 80
Val	Gly	Asp	His	Val 85	Val	Leu	Ser	Phe	Asp 90	Ser	Cys	Gly	His	Cys 95	Arg
Asn	Cys	Arg	Ala 100	Ala	Ala	Pro	Ala	Tyr 105	Cys	Asp	Ser	Phe	Ala 110	Ser	Leu
Asn	Leu	Phe 115	Gly	Gly	Arg	Ala	Glu 120	Asp	Pro	Pro	Arg	Leu 125	Thr	Asp	Gly
Ser 130	Gly	Ala	Ala	Leu	Ala	Pro 135	Arg	Trp	Phe	Gly	Gln 140	Ser	Ala	Phe	Ala
Glu 145	Tyr	Ala	Leu	Val	Ser 150	Ala	Arg	Asn	Ala	Val 155	Arg	Val	Asp	Pro	Ala 160
Leu	Pro	Val	Glu	Leu 165	Leu	Gly	Pro	Leu	Gly 170	Cys	Gly	Phe	Leu	Thr 175	Gly
Ala	Gly	Ala	Val 180	Leu	Asn	Thr	Phe	Ala 185	Ala	Gly	Pro	Gly	Asp 190	Thr	Leu
Val	Val	Leu 195	Gly	Ala	Gly	Ala	Val 200	Gly	Leu	Ala	Ala	Val 205	Met	Ala	Ala
Thr 210	Ala	Ala	Gly	Ala	Pro	Ser 215	Val	Ala	Val	Asp	Arg 220	Asn	Pro	Arg	Arg
Leu 225	Glu	Leu	Ala	Glu	Arg 230	Phe	Gly	Ala	Val	Pro 235	Leu	Pro	Ala	Ala	Thr 240
Ala	Gly	Leu	Ala	Glu 245	Arg	Ile	Arg	Arg	Leu 250	Thr	Asp	Gly	Gly	Ala 255	Arg
Tyr	Ala	Leu	Asp 260	Thr	Thr	Ala	Ser	Val 265	Pro	Leu	Ile	Asn	Glu 270	Ala	Leu
Arg	Ala	Leu 275	Arg	Pro	Thr	Gly	Ala 280	Leu	Gly	Leu	Val	Ala 285	Arg	Leu	His
Thr 290	Ala	Leu	Pro	Leu	Glu	Pro 295	Gly	Thr	Leu	Asp	Arg 300	Gly	Arg	Ser	Ile
Arg 305	His	Val	Cys	Glu	Gly 310	Asp	Ala	Val	Pro	Gly 315	Leu	Leu	Ile	Pro	Gln 320
Leu	Thr	Arg	Leu	Trp 325	Gln	Ala	Gly	Arg	Phe 330	Pro	Phe	Asp	Gln	Leu 335	Val
Arg	Thr	Tyr	Pro 340	Leu	Ala	Asp	Ile	Asn 345	Glu	Ala	Glu	Arg	Asp 350	Cys	Asp
Ala	Gly	Leu 355	Val	Val	Lys	Pro	Val 360	Leu	Leu	Pro	Pro	Ala 365	Arg	Ser	Arg

<210> 42
 <211> 301
 <212> PRT
 <213> Streptomyces parvulus Tu4055

<400> 42
 Met Thr Gly Thr Ala Pro Gln Tyr Thr Asp Val Glu Gly Val Asn Gly
 1 5 10 15

Gly Val Gly Leu Thr Ala Phe Leu Val Ala Ala Ala Arg Ala Ile Glu
 20 25 30
 Thr His Arg Asp Asp Ser Leu Ala Gln Asp Val Tyr Ala Glu His Phe
 35 40 45
 Val Arg Ala Ala Pro Ala Cys Ala Asp Trp Pro Val Arg Ile Glu Gln
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 Val Pro Asp Gly Asp Gly Asn Pro Leu Trp Gly Arg Phe Ala Arg Tyr
 65 70 75 80
 Phe Gly Leu Arg Thr Arg Ala Leu Asp Asp Phe Leu Leu Arg Ser Val
 85 90 95
 Arg Thr Gly Pro Arg Gln Val Val Leu Leu Gly Ala Gly Leu Asp Thr
 100 105 110
 Arg Ala Phe Arg Leu Asp Trp Pro Ser Gln Cys Ala Val Phe Glu Ile
 115 120 125
 Asp Arg Thr Gly Val Leu Ala Phe Lys Gln Gln Val Leu Thr Asp Leu
 130 135 140
 Ala Ala Thr Pro Arg Val Glu Arg Val Pro Val Pro Val Asp Leu Arg
 145 150 155 160
 Ala Asp Trp Ala Gly Ala Leu Thr Ala Ala Gly Phe Asp Pro Ala Ala
 165 170 175
 Pro Ser Val Trp Leu Ala Glu Gly Leu Leu Phe Tyr Leu Pro Gly Pro
 180 185 190
 Ala Glu Ser Leu Leu Val Asp Thr Val Asp Arg Leu Thr Thr Asp Gly
 195 200 205
 Ser Ala Leu Ala Phe Glu Ala Lys Leu Glu Lys Asp Leu Leu Ala Tyr
 210 215 220
 Arg Asp Ser Ala Ile Tyr Thr Ala Thr Arg Glu Gln Ile Gly Ile Asp
 225 230 235 240
 Leu Leu Arg Leu Phe Asp Lys Gly Pro Arg Pro Asp Ser Ala Gly Glu
 245 250 255
 Leu Ala Ala Arg Gly Trp Ser Thr Ser Met His Thr Pro Phe Val Phe
 260 265 270
 Thr His Arg Tyr Gly Arg Gly Pro Leu Pro Glu Pro Asn Asp Ala Leu
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 35 40 45

Ala Lys Ala Ala Val Arg Ala Ala Phe Arg Arg Tyr Trp Thr Thr Leu
50 55 60
Ala Thr Glu Leu Asp Ala Asp Gly Asp Gly Val Ile Thr Val Glu Glu
65 70 75 80
Phe Arg Pro Phe Val Leu Asp Pro Glu Arg Phe Gly Pro Thr Ile Ala
85 90 95
Glu Phe Ala Arg Ala Leu Ser Ala Leu Gly Asp Pro Asp Gly Asp Gly
100 105 110
Leu Ile Glu Arg Pro Leu Phe Val Ala Leu Met Lys Ala Ile Gly Phe
115 120 125
Glu Glu Ala Asn Ile His Ala Leu Phe Asp Ala Phe Ala Pro Asp Ala
130 135 140
Ala Asp Arg Ile Thr Val Ala Ala Trp Ala Ser Gly Ile Glu Asp Tyr
145 150 155 160
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Arg Thr Val

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 Val Asp His Met Lys Arg Arg Ala Arg Ala Ala Gly Leu Asp Arg Val
 35 40 45
 Arg Val Val Ser His Pro Pro Ala Glu Gly Phe Tyr Arg Ala Val Gly
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 Ala Leu Pro Thr Gly Thr Ala Arg Ala Asn Pro Pro Ala Val Ala Trp
 65 70 75 80
 Asp Arg Pro Val Leu Glu Phe Leu Ile Pro
 85 90